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Tramrail Reduces Labor Force to Half

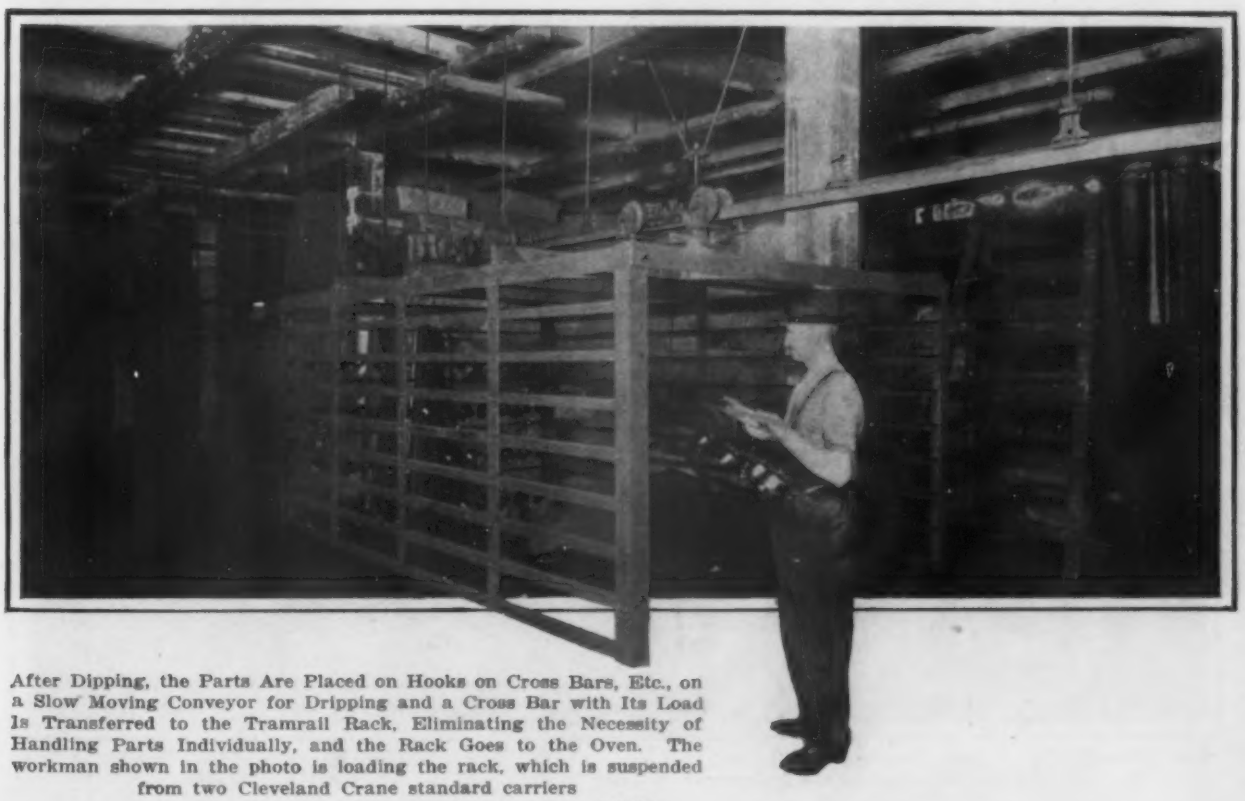
Japanning Department of Globe Machine & Stamping Co. Uses One Oven in Place of Seven —Old Elevator Shaft Carries Away Fumes

A MARKED reduction in production costs has recently been effected by the Globe Machine & Stamping Co., Cleveland, by the installation of a new conveying system and japanning equipment. The conveying equipment includes a transportation system for the handling of sheet metal stampings from the press room on the first floor to the japanning department on the second floor, through a continuous baking oven and on to the final assembling, shipping and storage departments. The new equipment includes a japanning oven, rather unusual in construction, and its arrangement shows a practical use for a discarded elevator shaft in reapportioning a plant to cut production costs.

The company's product consists largely of metal tool and battery boxes and other stampings used chiefly in the automobile field and requiring a japanned finish. The plant is equipped for operation on a high production basis and the handling of the product from one department to another has hitherto not only entailed a high labor cost, but has to some extent been a retardant to maximum production.

With the new arrangement of conveying equipment, all parts that are to be japanned are carried on electric trucks from the manufacturing departments on the first floor to the washing room, where they are fed by hand to a Niagara washing machine. Tool and battery boxes are delivered from the machine onto an endless conveyor, 42 ft. long, inclined to about 45 deg. This conveyor delivers them onto a table in the japanning room on the floor above. Small stampings are taken from the washing machine, piled on trucks, and are carried up in an elevator to the japanning room. Work carried up on the conveyor is diverted by an inspector to wipers, cleaners and polishers or directly to the japan dipping tank.

The japan dipping tank is arranged with connections to three 10-barrel japan storage tanks on the floor below. These contain the three grades of japan that are used, one for the first coat, one for the second, and the third for the finishing coat. The japan is forced from the storage tanks to the dipping tank under air pressure. The supply is drawn off each night and pumped back in the morning. With this arrangement the japan has a chance to settle in the tank over night. The material is thoroughly mixed when being pumped up to the dipping tank and fire hazard is reduced. If during the day a change from one to another



After Dipping, the Parts Are Placed on Hooks on Cross Bars, Etc., on a Slow Moving Conveyor for Dripping and a Cross Bar with Its Load Is Transferred to the Tramrail Rack, Eliminating the Necessity of Handling Parts Individually, and the Rack Goes to the Oven. The workman shown in the photo is loading the rack, which is suspended from two Cleveland Crane standard carriers

grade of japan is desired, it takes but little time to empty the dipping tank by allowing its contents to drain back into a storage tank and then to refill the dipping tank from another storage tank.

After dipping, the work is hung on hooks on cross bars suspended from a slowly moving overhead conveyor, directly back of the dipping tank. This conveyor is 67 ft. long and 10 ft. wide. It takes approximately 30 min. for the work to pass from one end of the conveyor to the other, during which time the surplus japan drips off and the preliminary drying takes place. The conveyor is roofed over and partially inclosed at the sides to prevent floating dust from adhering to the work.

After leaving the drying conveyor work is handled through the oven and on to its destination on a tramrail system installed by the Cleveland Crane & Engineering Co., Wickliffe, Ohio. This system consists of hand-operated carriers and eight racks or cages, especially designed for holding the work, and the necessary monorail tracks and switches. The racks are constructed of angle iron, being virtually steel frames with open bottoms. They are 10 ft. long, 6 ft. wide and 4 ft. high. When running on the monorail, the bottoms of the racks are 2 ft. above the floor.

In transferring work from the drying conveyor to the conveying system that is to carry it through the oven, the cross bar is carried with its load of several small parts to the rack, on which the cross bar with its load is suspended, avoiding the necessity of handling the parts individually.

Each rack is suspended from two standard carriers of 2000-lb. capacity each. Two tracks run into and through the oven, which holds four racks at a time. The racks are pushed into the oven and, after the work is baked, pass through doors on the opposite side and are pushed along the trolley system and through switches are diverted to the various departments on the second floor for further assembling operations, to the chutes for loading on cars, to the shipping department or to the warehouse for storage. When a rack is emptied it continues its circuit around the floor back to the place for loading in front of the baking oven.

While a carrier, with its rack and full load, weighs approximately two tons, the design of the tramrail system makes it so easy of operation that one man can push the load along on the rail. The tramrail system is designed for hard service. The wheels on the carriers run on a double row of ball bearings. The wheel serves as an outer race for the bearings and is chilled at two points—where the wheel comes in contact with the rail and where the balls come in contact with the wheel or race. The race is ground on the chilled surface of the wheel. The inner race is of hardened high carbon steel, the seats for the balls being ground on the race after hardening.

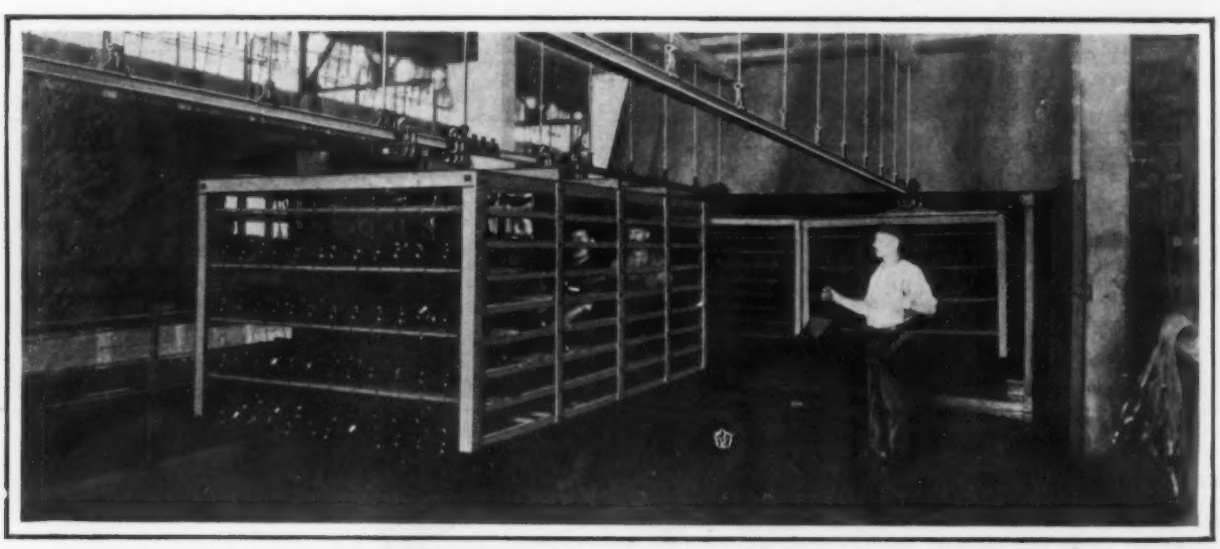
Although the carrier with the rack is 10 ft. long, it can be operated on a curve with a 4-ft. radius. To the rail is attached a rail clamp at regular intervals and these clamps, in connection with hanger rods of various lengths, suspend the system from overhead supports. The hanger rod can be screwed either in or out of the rail clamp so that the rail can be suspended perfectly level, regardless of whether the ceiling or overhead support is level. The method of suspension makes the rail flexible instead of rigid, permits the easy movement of the rail under the wheels of the carrier, thereby avoiding the danger of having the carrier so loaded that the load is carried on the wheels on one side of the carrier. It is stated that the rail will twist under the load sufficiently to permit an even pressure under every wheel. In order to prevent the rail swinging under the load, side strain brackets are used to limit the side movement.

The switch is so designed that the carrier can pass over it smoothly and it has a safety stop that prevents the carrier from running off the rail at the open end of the switch.

The japan baking oven is located in an elevator shaft which was no longer being used for its original purpose. The oven is 14 ft. wide, 20 ft. long and 8 ft. high. It is oil-fired through Ray burners on the lower floor, 12 ft. below the oven.

The heat is carried through a 2 x 2-ft. brick flue to the floor of the oven, where it passes around a baffle plate and through the oven. With this arrangement the burners do not connect directly to the oven chamber. Two outlets, 10 in. in diameter above the oven, run into the elevator shaft and the fumes are carried up the elevator shaft to the roof and are discharged through openings in the sides of the pent house. A damper is provided in the basement at the bottom of the flue to provide and regulate the fresh air supply. Connected to the oven is a Wilson-Maeulen Co. thermo electric temperature indicating instrument. The temperature is taken at three points in the oven, including the warmest spot, or directly above the flue, and at one corner where the temperature is likely to be the lowest. The efficiency of the oven is such that the heat variation at different parts of the oven is less than 5 deg. Fahr. and the oven has proved unusually efficient in fuel economy.

Before installing the new equipment the parts to be japanned were carried into the oven by hand and with the time required to cool the oven after a heat sufficiently for the workmen to go inside and with the



Two Tramrail Tracks Run Through the Baking Oven Shown in the Background, the Capacity of the Oven Being Four Racks. The rack in the foreground is being loaded while the others are in the oven

A Loaded Rack That Has Come from the Oven Is Here Being Pushed by One Man Along the Track on Its Way to the Assembly Department

time taken for loading, only three heats could be taken during a day. With practically continuous operation by pushing in the four loaded racks as soon as the four others are taken from the oven, and with no cooling of the oven being necessary, ten heats can be taken in a day. With the old system, seven ovens were used, one of the same size as the present oven, the total oven capacity being more than double the amount provided by the one oven now used. Then the japanning department was unable to turn out work as rapidly as it came from the other manufacturing departments. Now this department can handle work faster than produced in the stamping department. From the standpoint of labor efficiency with the economy of handling by means of the tramrail system, more pieces can go through the japanning department with less than half the number of men formerly employed.

The conveyor system was laid out to meet the special requirements of the plant by the engineering department of the Cleveland Crane & Engineering Co. in conjunction with the engineers of the Globe Machine & Stamping Co. The baking oven was designed by R. R. Root, superintendent of the Globe plant.

Attaching Wire Rope to a Socket

When wire rope is used with a socket attached, it is important that the socket be attached in such a way that the full strength of the rope may be developed. It is a common thing in factories where there is not enough work of this kind to employ an experienced hand on cables, to have the engineer or repair man do the best he knows how. In discussing the subject, E. J. Edwards, superintendent of foundry maintenance of the General Electric Co. at Erie, Pa., says he has seen lead, solder, soft babbitt, etc., used in sockets, and, upon inquiring, finds the man who did the job was a good mechanic but had no idea just what should be used and what should be done to prepare the cable for the operation.

When the work is done in the ordinary way, Mr. Edwards points out, the wires are bent back on each other and the basket of the socket filled with lead, babbitt, etc. Sockets attached in this manner under no circumstances should be used on elevators, cranes or hoisting machinery, as many times they result in the socket's pulling away from the rope. The wires are not all engaged and some of them creep back into the rope preventing a perfect contact between rope and socket.

He considers one of the most important operations in attaching a wire rope to a socket is to clean both socket and part of rope to be attached. The end of rope should be served securely and the socket cleaned well with gasoline or kerosene oil. Then the rope is passed through the socket and served again for a distance from the end equal to the length of the basket or socket, being very careful not to let the strands or the lay of the rope open. After this is done, the hemp center should be cut off the length of the opening and the wires in the strands separated. This can be done by using a small piece of pipe or a marline spike. Then the wires are cleaned well with gasoline, and dipped in a solution of one half muriatic acid and one half water for five minutes' soaking. The wires are then dipped in a solution weakened by the addition of one part more water. After wiping dry, the socket is pushed over the wires until they are even with the top of the basket of the socket. Friction tape is wrapped around the rope at the bottom of the socket to serve as a shield and melted zinc is poured into the basket of socket.

German Bauxite Supplies

Germany's bauxite production before the war was so insignificant as to render her virtually dependent on French supplies, the total requirements in 1913 amounting to about 38,000 tons valued at more than 2,000,000 m. With a view to becoming independent of foreign bauxite, steps were taken, during the war and since, to explore domestic bauxite fields. Valuable deposits worth working were found in Hessen. They are being exploited by the Bauxitwerke Aktiengesellschaft at Giessen and represent the only mines in operation in Germany. The principal consumer of the ore is the state-owned Lauta works with an annual output capacity of 14,000 tons of aluminum while the rest is taken by other electric smelting works, emery works and the chemical industry, used by the latter in the production of aluminum salts. The present average monthly output, representing the production of 15 mines employing about 300 men, is 1200 tons but there is claimed to be nothing in the way of increasing output by sinking new shafts and employing additional labor. In accordance with the growing demand, it is planned to bring production to 20,000 tons during 1922.

Over 30 proposals for adoption as standards in automobile manufacture will be presented at the meeting of the standards committee of the Society of Automotive Engineers in the Engineering Societies Building, New York, on Jan. 10. Sixteen divisions representing different fields in the automotive industry and parts or material manufacturers will be represented. The iron and steel division will submit a complete revision of the present iron and steel specifications which have been used widely in industries other than the automotive industry since they were first published in 1911.

Piette By-Product Coke Ovens at St. Louis

Simplicity and Substantial Construction Are Features —Modification of Design, Just Patented, in the Interest of Fuel Economy Through Better Combustion

MORE than fifteen hundred Piette-type by-product coke ovens are in commercial operation in Europe, but the first battery to be constructed in this country was recently completed at the Carondelet oven station of the LaClede Gas Light Co. of St. Louis. This installation of eight ovens was built for experimental purposes at the expense of the Franco-Belgian Coke Oven Corporation, Brussels, Belgium. The design is an adaptation of the European oven to American practice, giving recognition to differences in coking methods and to the quality of coal used, as well as to the wider utilization of silica brick in this country. The results achieved were so favorable that an American company, known as the Belgian-American Coke Oven Corporation, was formed to market the ovens in the United States. This corporation controls also a recently patented Piette oven which will give a still more perfect combustion of gas and air for heating the ovens and will obtain greater constancy in the temperature throughout the length of each oven chamber.

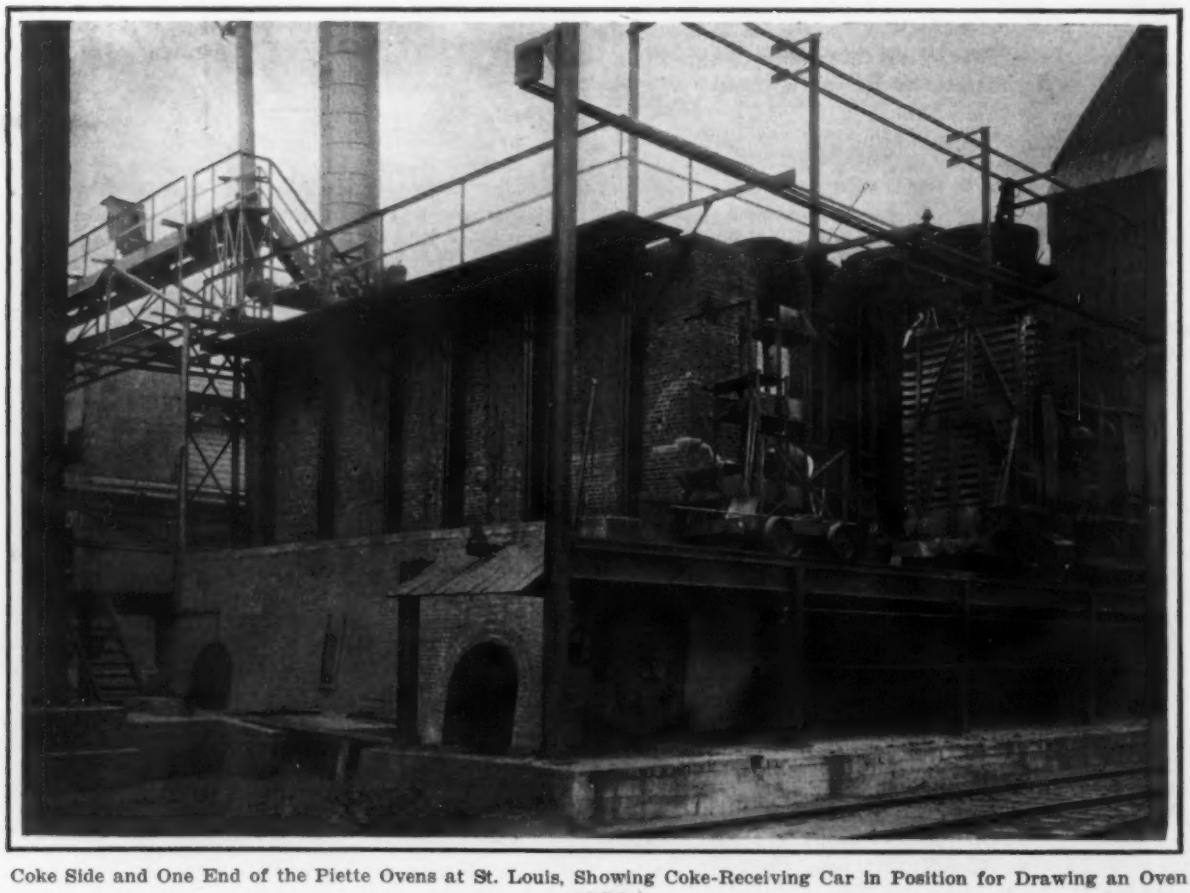
Styled by the designers as Type C, the St. Louis ovens are of the horizontal type, with vertical flues and transverse regenerators. The regenerator chambers extend the whole length of the battery, at right angles to the heating walls and oven chambers. Although arranged in longitudinal chambers, the regenerators are actually of the transverse type, and the products of combustion pass through the checker work in a direction parallel with the axis of the ovens, taking a longitudinal course only after reaching a free space in the outlet chambers. There are four parallel regenerating chambers—a pair of primary and secondary regenerators in each half of the battery, arranged conversely, the primary regenerators being adjacent to the outside walls.

Galleries have been placed under the regenerators, as well as between the oven soles and the secondary regenerators, for the passage of air prior to its introduction into the regenerating chambers. This arrangement permits the air to absorb heat which would otherwise be lost by radiation through the chamber walls. Tests have shown that the air heated in this manner reaches a temperature of from 200 to 280 deg. Fahr. before entering the regenerators.

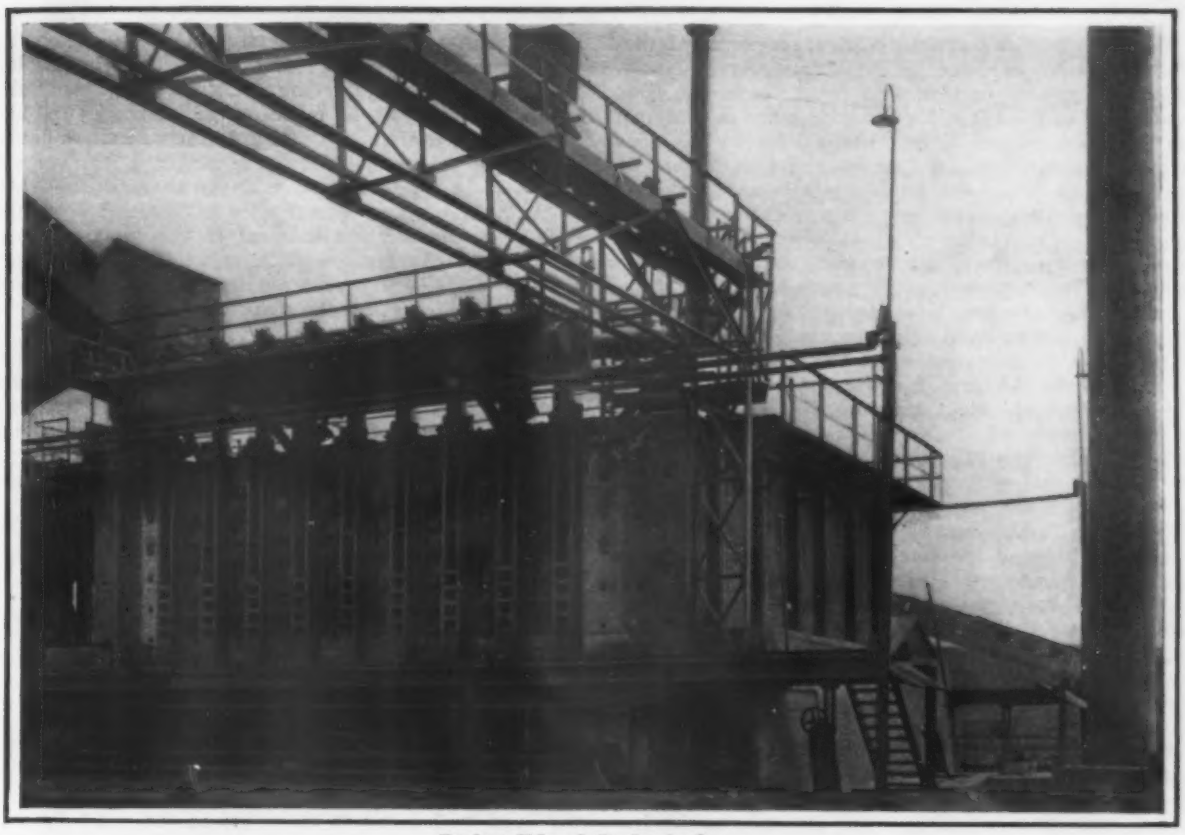
The sections of the flues connecting each pair of primary and secondary regenerators are so designed as to compensate for the effect of the drop in pressure in the secondary chamber, where, after leaving the checker work, the burnt gases pass lengthwise of the battery to the stack. The total resistance is lowered to ¼ in. of water gage, instead of 1 in. or more, as is often the case with longitudinal regenerators which do not operate transversely. Thus the pressures in the oven chambers and heating flues are more nearly equalized, making for a maximum of gas tightness and a maximum recovery of by-products.

While the passage of air and burnt gas through the regenerators is at right angles to their axis, the fact that each regenerating chamber is continuous from one end of the battery to the other insures a uniformity of temperature throughout the entire battery, and prevents the possibility of differentiation of heating between ovens, as happens when separate regenerators are used for each oven. In this connection, the designers of these ovens contend that the amount of gas required per hour in heating by-product ovens is so small as to make it exceedingly difficult to regulate the heat of individual regenerators for so many ovens. Continuous longitudinal regenerators, they assert, are the only insurance against irregularity in the various oven temperatures.

An outstanding feature of the Piette ovens is the stability of their construction. The regenerators are at right angles to the ovens, and the intersection of



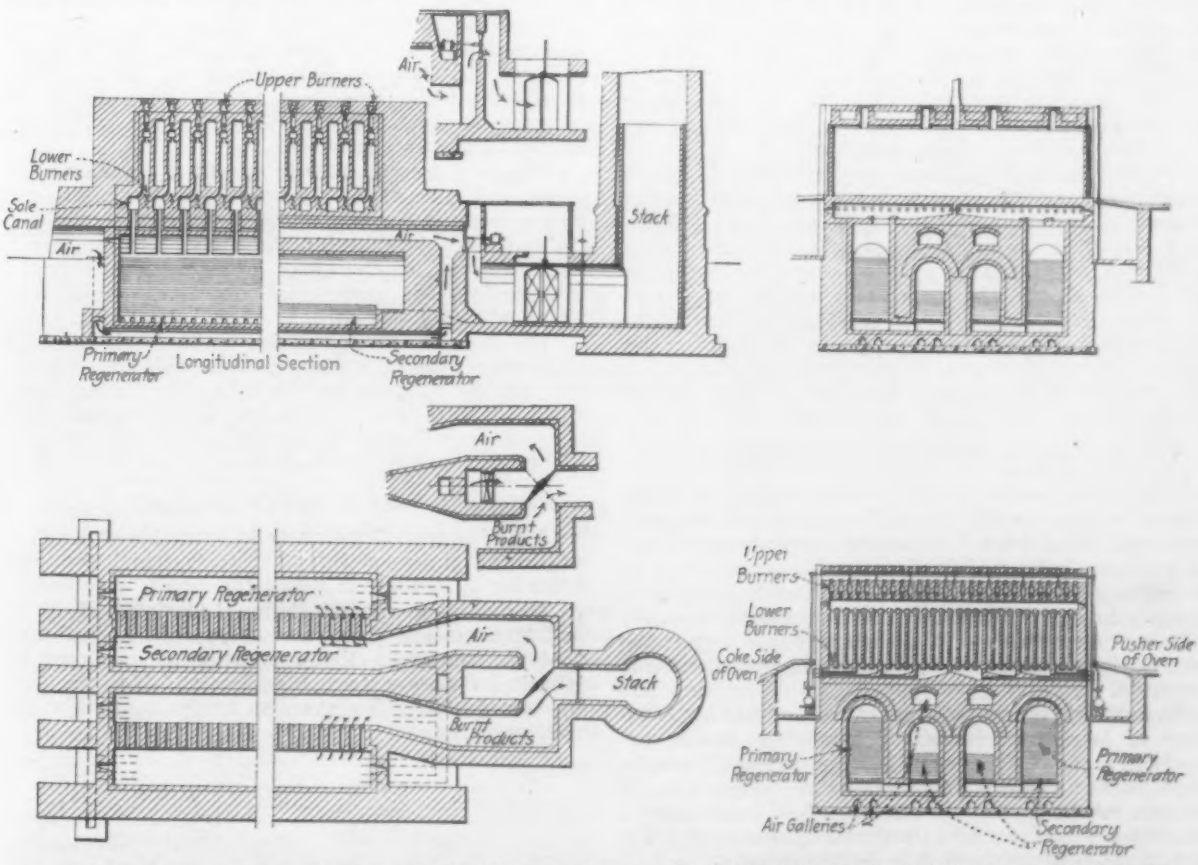
Coke Side and One End of the Piette Ovens at St. Louis, Showing Coke-Receiving Car in Position for Drawing an Oven



Pusher Side of St. Louis Ovens

the two series of walls makes for solidity throughout the entire structure. The expansion of the linings and of the arches of the regenerators, as well as of the flues connecting the primary chambers with the sub-sole flues, is completely independent of the sustaining mass of the battery. Consequently, the refractory material which constitutes the sole-oven walls and the ovens rests on a rigid monolithic block, which cannot be deformed. An allowance of 2 in. for expansion has been allowed on both the pusher and coke side of the ovens, as well as on top; but the construction is such that the chambers remain tight, and no cracking results. When, however, the oven walls rest on the regenerator walls below them, and are really a part of those walls, as is the case in some types of construction, it is contended that unequal expansion is bound to obtain, because of the different temperatures to be found from the foot of the regenerator walls to the top of the oven walls.

The axis of the battery divides the heating walls



Longitudinal, Transverse and Plan Sections of Piette Ovens. The installation at St. Louis has no upper burners, as featured in the new design. Upper view at right is a section through the oven chamber; below it is a section through the heating flues and regenerator chambers. The variations shown around the reversing valve are of interest.

of the ovens into two symmetrical parts, reversals being made from one side to the other every 30 min. Each oven wall is divided into eight chambers, four in each half of the battery. Each chamber is equipped with burners for three or four vertical flues. The area of the air nozzle for each burner, and the number of flues per chamber, have been carefully calculated to make for uniformity of temperature throughout the oven. Thus, the chambers at each end of the oven contain only three flues, to counteract the cooling effect of the outside atmosphere. The second chamber from the coke end of the oven also contains only three flues, greater intensity of heat being required per wall area at that point to compensate for the greater width of the oven on the delivery side.

As a result of this arrangement—with two small chambers at one end of the wall and one small chamber at the other end—the reversing axis of the battery does not coincide with its metrical axis. The same amount of gas is fed to the short or coke side of the oven wall as to the long or pusher side. Gas is fed to the chambers by individual tuyeres, each provided with a regulating cock. Independent of these cocks is also a control cock common to each half-wall. The air supply for each half of the oven wall is regulated by a damper located at the junction of the sole canal with the primary regenerator. Fixed sections, determined by calculation and confirmed by practise, are used to regulate quite closely the discharge of burnt gases from the top of the vertical flues, thereby rendering the use of dampers unnecessary. Numerous dampers, the Piette engineers contend, are always difficult to handle, and often stick to their seats after having been in use for some time; furthermore, they put regulation at the mercy of the indifference or incompetency of the heaters.

The separation of the flues, with an upward flow of gas from the half of the oven wall containing the flues, with a concurrent downward flow, reduces the possibility of leakages or short circuits of the heating flames.

Reversal of the draft and operation of the burner valves are accomplished by the operation of a single lever. The reversing valve alternately connects one of the two secondary regenerating chambers with the chimney, at the same time effecting the entrance of air into the opposite secondary chamber. While not essential, the use of a blower to drive the air tends to establish an equilibrium of pressures between the oven chamber and the heating wall flues, thereby serving to prevent the springing of leaks for the escape of gas, even when an oven is being overworked.

Regulation of the battery is facilitated by sight-holes which permit the inspection of the interior throughout the route of the flames and gases. Sight-holes placed at the ends of the primary regenerators permit a view of the top of the checker work for the full length of the chambers. Sight-holes on top of the ovens permit inspection of each vertical flue in the oven walls. If any chamber is being insufficiently heated, due, for instance, to an accidental obstruction of a cock or of a gas pipe, this immediately becomes apparent.

Modification in Design Just Patented

Although gratified by the results obtained from the battery at St. Louis, the engineers of the Belgian-American Coke Oven Corporation have designed and patented a slight modification in the construction of the ovens which, they believe, will result in greater economy in gas consumption and increased uniformity in oven temperature. The change will also permit the use of a larger proportion of high volatile coal than is now used.

In heating oven walls by means of vertical flues, one cause of loss of efficiency has heretofore proved unavoidable: Any air admitted to the heating flues, in excess of that strictly required for the combustion of the gas, involves a loss in efficiency, because it carries away heat which can be only partially recovered. Yet in vertical-flued ovens it has been necessary to mix more air with the heating gas than theory requires, for two reasons. The theoretical mixture of gas and air, burning within the necessarily short space of the vertical flue, would overheat those portions of the flue lining nearest the burners, so that even the silica bricks of which it is made would melt. It is also necessary to use an excess of air to insure short flames which will not extend above the height of the vertical flues. It is essential that each flame give the whole of its heat to the vertical slice of coal which corresponds to the combustion flue; if the flame were to extend into the horizontal inversion flue, local overheating of the wall would result, and efforts to obtain uniformity in heating the distilling chamber would be nullified.

These obstacles are believed to have been overcome in the new design. The superstructure of the oven alone has been modified, a channel having been provided above the refractory top of each oven wall and above the horizontal inversion flue. Within this channel, which is open to the air at both ends, two gas pipes with burners are laid—one in each half of the oven wall. So as not to interfere with the inspection of the combustion flues through the sight-holes, the pipes are placed on one side of the channel, instead of in the middle. The purpose of the burners in this channel is to consume the oxygen remaining in the burnt gases discharged from the combustion flues.

Under this plan, the upper burners are active at the same time that the lower burners are operating in the opposite half of the oven wall. Thus the design not only makes for more complete use of the air, but also provides for combustion throughout the length of the oven at all times, the lower burners of one-half of the oven wall being in operation at the same time as the upper burners of the other half of the wall. The same control cock which admits the gas to the lower burners also introduces the gas into the upper burners, gas being fed simultaneously to the upper and lower burners of opposite halves of the oven wall.

According to the engineers, the new design will insure maximum efficiency as the result of perfect theoretical combustion. At the same time, the whole surface of the oven wall is made available for intensive heating; whereas, in the ordinary reversing system, in which gases burnt in one half-wall are sent through the other half-wall, nearly 50 per cent of the heat-transmitting surface is lost, as the burnt gases, upon reaching the horizontal inversion flue, are cooled to such a degree that they have few calories left to yield to the flues in their downward flow. Another possible material advantage of the intensive heating will accrue from a substantial reduction in the time necessary for carbonization.

The new design also will permit a considerable increase in the height of the ovens, and thus allow much larger loads to be handled without, in the opinion of the engineers, lengthening the coking time or increasing the length of the ovens. Using the new type of construction, the corporation expects to build ovens which will coke over 25 tons of coal per 24 hr.

The ovens now in operation at St. Louis are 37 ft. long between doors, and are 18½ in. wide on the pusher side and 21 in. wide on the coke side. Their height under the arch is 9 ft. 10⅝ in. Under normal conditions they are heated by 37 per cent of the gas given off by the coke—in terms of B.t.u.

Results of Tests at St. Louis

A 30-day test of the ovens in operation at St. Louis was begun three months after their completion. The following data show in detail the results obtained:

The mixture of coal charged consisted of 65 per cent high volatile Elkhorn coal from the Consolidation Coal Co. mines in Kentucky, and 35 per cent low volatile Pocahontas from the Cleveland-Western Co. of West Virginia. The average analysis of this mixture was:

Moisture	4.43 per cent
Volatile hydrocarbons	29.06 per cent
Fixed carbon	61.37 per cent
Ash	5.14 per cent
	100.00 per cent

The load of one oven was weighed daily and was then screened, following which samples were submitted

to laboratory tests. The screening was done on an inclined screen with 2½-in. roller grizzly. The results of the tests follow:

Ovens and Coal

Total number of ovens charged and pushed	282
Total quantity of coal charged in 30 days	7,549,400 lb.
Average load per oven	26,770 lb.
Average coking time	20 hr. 18 min.
Average quantity of coal charged in 24 hr. per one oven	31,455 lb.
Average temperature of smoke at outlet of heat regenerators, corresponding to 3.8 per cent oxygen pr an excess of 25 per cent of air	624 deg. Fahr.

Coke

Total quantity of coke produced in 24 hr. in one oven	21,764 lb.
Total yield of dry coke, calculated on coal as charged	69.19 per cent
Proportion of foundry coke in total coke	38.15 per cent
Proportion of other cokes	61.85 per cent
Average analysis of the total coke obtained:	
Moisture	1.94 per cent
Volatile matter	0.96 per cent
Fixed carbon	90.33 per cent
Ash	6.77 per cent
Specific gravity:	
Apparent	0.973
Real	1.906
Porosity:	
Coke substance by volume	51.03 per cent
Air spaces by volume	48.97 per cent
Shatter test	55.57 per cent

Heating Gas

Cu. ft. of gas burnt during the 30 days, at 30 in. pressure and 60 deg. Fahr.	20,332,000
Volume of gas burnt per lb. of coal charged	2.693
Heating value of this gas (B.t.u. per cu. ft.)	479.3
B.t.u. consumed per lb. of coal charged	1,290.7

Gas Produced and B.t.u. Available

Total cu. ft. of gas produced during the 30 days, at 30 in. and 60 deg. Fahr.	44,159,000
Volume of gas produced per pound of coal charged	5.849
Average calorific value of this gas (B.t.u., per cu. ft.)	564.5
Total quantity of B.t.u. available per lb. of coal charged (non-debenzolized gas)	3,301.7
B.t.u. (surplus) available per lb. of coal treated	2,011.0

Average analysis of the gas produced:

CO_2	1.7 per cent	CO	6.1 per cent
C_nH_m	3.4 per cent	CH_4	29.8 per cent
O_2	0.4 per cent	N_2	6.8 per cent
H_2	51.8 per cent		

Average specific gravity at 30 in. mercury and 60 deg. Fahr. 0.39

Yields of By-Products Per Net Ton of Coal Carbonized

Ammonia (NH_3)	5.63 lb.
Tar (dry)	7.01 gal.
Benzol (product distilling below 200 deg. C.)	3.42 gal.

These figures show that the yield in available B.t.u. would be—after deducting the B.t.u. needed for heating the ovens—60.9 per cent of the total B.t.u. produced.

This satisfactory proportion does not, however, represent the real power of this system of ovens, the engineers declare. A small number of ovens cannot give the same yield as a bigger battery—say 50 or more ovens of the same type. In a big battery the gas used for the heating of an end-wall is distributed over a larger number of ovens, and as matter of course over a larger quantity of the coal distilled. If the heat lost in one end-wall is distributed over a battery of 50 to 60 ovens—the average number in a modern battery—the reduction in B.t.u. consumed would be, it is asserted, fully 6 per cent. Taking this into account, the calorific balance sheet of the Piette ovens at St. Louis would be:

B.t.u. produced per pound of coal	3,301.7	100.00 per cent
B.t.u. in the surplus gas	2,088.4	63.25 per cent
B.t.u. consumed in the heating gas	1,213.3	36.75 per cent

This consumption is said to be the smallest yet realized in the United States, considering the conditions imposed by the tests.

The purchasing agents of factories of Marion, Ind., have formed an organization with Raymond M. Oaks chairman and Ancil Witmer, vice-chairman. The association is for the exchange of ideas and the consolidation of shipments of raw material and supplies. It is believed the movement will result in a large saving of money for the industries.

The Velie Motor Co., Marion, Ind., has begun operations with 150 employees. The Western Drop Forge Co. has resumed operations with excellent prospects, and the Indiana Truck Works has added to its force of employees.

HELPING BUSINESS

Secretary Hoover and Director Klein Tell of Progress and Plans

WASHINGTON, Dec. 13.—Though the report of the Department of Commerce is for the entire fiscal year ended June 30, 1921, Secretary Hoover points out that it covers but four months of the administration of the department under his direction. Summarizing the activities of the new Administration during these four months, the Secretary said that the time had been devoted to two primary questions: "First: Reorganization of the departmental expenditures. Second: Reorganization of those bureaus concerned with industry and trade, that they may become of more effective service to the community.

"The results of reorganization enabled a revision of the estimates of expenditure for the fiscal year 1921-22, so that while the total appropriations available for the department for this period are $24,222,192, yet it now seems probable that the expenses during this fiscal year will approximate $20,200,000, showing a total saving of about $4,000,000, or 16 2/3 per cent of the available appropriations.

"The results of reorganization of the bureaus concerning industry and trade are in part indicated by the increase in volume of demand upon the department for helpful action or information. These demands have now reached a rate of over 500,000 per annum.

"The further practical results to American commerce and industry will be more evident later in the year and comment upon them can best be deferred until results have been further realized.

"The establishment of a real Department of Commerce, effective in service to the producers, manufacturers, and distributors of commodities, able to give economic interpretation of importance to the American public generally, to stimulate American trade and merchant marine, requires a thorough reorganization and entire regrouping of the Federal functions bearing upon these problems. Inasmuch as these matters are not actively before Congress and the Administration, it is not necessary on this occasion to enter upon discussion of them."

Director Julius Klein of the Bureau of Foreign and Domestic Commerce has the following to say:

"The bureau requires great additional strength if it is to serve the purpose really intended by Congress and meet the demands that are made upon it by the business men of the country in their present distress. Not only should more attention be given to trade promotion, with which the bureau has been almost exclusively concerned in the past, but it should be possible to make the more detailed economic surveys that are now so indispensable because of the enormous financial interest we have in foreign fields. There never has been a time in the past, and perhaps may never be in the future, when accurate economic data on the situation in foreign countries was so vital to our material well-being.

"Before the close of the fiscal year under review, Congress provided funds for the establishment of commodity divisions in the bureau, and shortly after the beginning of the new year a sufficient number of high-class men were found to organize some twelve or fourteen such divisions. These divisions will not only organize and direct the collection of information abroad concerning their commodities (such as textiles, coal, machinery, etc.), but will set up, with the active help of the industries themselves, the machinery for the best possible distribution of such information. These divisions are revolutionizing the methods of the bureau and should be considered a long and important step in the right direction. Next year another long step should be taken and money should be forthcoming to expand the work along logical lines.

"Congress has also very wisely provided a new technical division to handle the difficult subject of foreign commercial laws. The bureau should have more technical divisions of this sort to provide really expert advice on such subjects as foreign credits, packing, and transportation."

ABSORPTION METHODS

Federal Trade Commission Discusses Practices Tending to Lessen Competition

WASHINGTON, Dec. 13.—That the Federal Trade Commission issues only a small number of formal complaints and a still smaller number of orders compared with the number of cases it handles in which unfair competition is charged is indicated by its sixth annual report. The report states that it has handled some 3000 cases of this kind, and has issued 788 formal complaints and 480 orders. The commission states that it is significant that with very few exceptions these cases have been brought to its attention by business itself, but it apparently overlooks the obvious fact that in the vast majority of instances the charges are not well founded, for otherwise more complaints and orders would ensue.

The commission, realizing it has no punitive powers by way of assessing fines against or imprisoning offenders, but may merely issue cease and desist orders, subject to review by a court, makes it plain that it would like to have its authority broadened. This is seen in the statement that ineffectual features of the Clayton Anti-Trust Act have been brought to the attention of Congress. It is stated that activities of the commission under this act have developed the fact that frequently the effect of a tying contract may be to enable the seller to hinder competition without bringing himself within the prohibitive terms of the law.

This practice is referred to as one of four methods which the commission says it has handled in cases under the Clayton act relating to the absorption of competing companies by a single unit and other practices tending to lessen competition and to create monopoly. These practices, other than the one mentioned, deal with the acquisition of shares of capital stock, to interlocking directorates, and to discrimination in selling price, and wider authority to control them is sought.

"The commission has found," says the report, "that corporations frequently now absorb competitors, not by acquiring capital shares but by acquiring the physical assets which the Clayton act does not forbid. Likewise the commission has found that a great business unit lessens competition more often by the device of discrimination in price in buying its raw material than by discrimination in price in selling its product. Similarly, it has been found that concentration of control of supposedly competitive units in the hands of a few is accomplished more often by ownership of capital shares by that few by control through common directors.

The Economic Division of the commission discusses briefly the situation as to receiving reports from steel interests, mentions the injunction restraining the commission from compelling reports to be made and says that because those received were not considered suitable for publication of average results, the commission last November advised those reporting to stop.

STANDARDIZATION IN INDUSTRY

Its Significance to Industry and to the Federal Government

A. A. Stevenson, chairman American Engineering Standards Committee, in an address before the American Society of Mechanical Engineers, Washington Section, Dec. 9, expressed the belief that the present is "a particularly opportune time for the launching of extensive cooperation between government and industry. The United States Government is probably the largest purchaser of materials in the world. It maintains an unrivaled group of research organizations, the one object of which is the furthering of the development of our industries. In addition to the continuing work of the Government in promoting the national welfare through such aids as it may properly give to industry, the efforts of the present Administration have shown a keen appreciation of the importance of standardization and of its bearings upon industry as a whole, and constitute a most significant development in the relation of the Government and industry.

"In both Great Britain and Germany," he continued, "national standardization is being carried on intensively. The German industries are carrying out a far-reaching program of standardization as a necessary step in building up an unprecedented industrial structure which must rest in large measure on an extensive foreign trade. It is being woven very intimately into the industrial fabric of the country, under the guidance of an organization which functions very much like the American Engineering Standards Committee, and in its work 5000 German industrial firms are cooperating.

"A recent event of unusual importance was the organization of the Federal Specifications Board for the purpose of unifying the specifications for all purchases to be made by the Government, military as well as non-military. This board has been charged with the duty of compiling and adopting standard specifications for materials and services, and bringing specifications into harmony with the best commercial practice wherever conditions permit, in order to broaden the field of supply. If common standards are arrived at for the Government and the industries of the country, might it not be advantageous to have a common agency charged with the duty of determining what materials and services do meet properly the standards adopted? It is understood that, in at least two of the most important industries of the country, plans are now under consideration for the establishment of such a common bureau of inspection.

"It cannot be too often repeated, that a national standardization program means almost unlimited advantage to the manufacturer in cheapening the processes of production and stabilizing his market; to the distributor in clarifying and simplifying his problems; and to the ultimate consumer by lessening costs and expediting deliveries, with whom the Government as a purchaser is to be included; and to the Government as a body of great research agencies, by selling the results of its researches to industries in return for an increased prestige with the general public and an increased support from industry."

British Pig Iron and Steel Output Increased in November

(*By Cable*)

LONDON, ENGLAND, Dec. 13.

The production of pig iron in Great Britain in November was 271,800 gross tons and that of steel ingots and castings, 442,800 tons. These compare with an output of 235,500 tons of pig iron and 405,400 tons of steel in October, with 158,300 tons of pig iron and 429,300 tons of steel in September and with 93,600 tons of pig iron and 432,600 tons of steel in August. The average pig iron output for the 11 months of this year has been 212,400 tons per month and that of steel 294,890 tons per month. In 1920 the production of pig iron averaged 667,300 tons per month and of steel ingots and castings 754,700 tons.

Unemployment still is decreasing in Pennsylvania, according to the semi-monthly report of the State Department of Labor and Industry, which shows the number registered for work at the various district offices as of Dec. 1, to have been 269,322, as compared with 271,430 on Nov. 15 last. The figures by districts follow: Altoona, 13,020; Erie, 13,100; Harrisburg, 11,292; Johnstown, 9260; McKeesport, 3940; New Kensington, 3750; Philadelphia, 128,000; Philadelphia, women, 11,600; Pittsburgh, 51,400; Scranton, 17,725; Williamsport, 6235.

Double Helical or Herringbone Gears

Use of Long Addenda in the Pinion and Short Addenda in the Driven Gear, to Increase the "Follow Through"

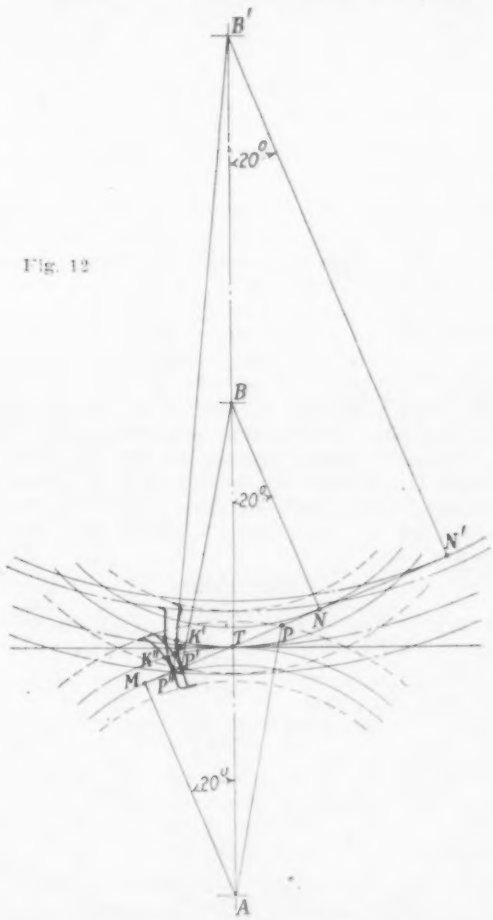
BY HOWARD H. TALBOT*

(*Concluded from page* 1473, *Dec.* 8)

LET us investigate now the possibility of using long and short addenda, so as to reduce the arc of approach and increase the arc of recess.

As before, $K'T$ = arc of approach and KT = arc of recess; and KT is greater than $K'T$. Also, to insure

Fig. 12



conditions of continuous contact, etc., total arc of contact KTK' should be at least as great as the circular pitch—better, a little greater. (Fig. 13).

Assume the addendum of the pinion as long as would be considered good practice; i.e.: equal to standard for the tooth section normal to the axis, or $\frac{1}{dp}$

This would produce a standard dedendum on the gear or driven pinion. Inasmuch as, for pinions having comparatively few teeth meshing together, the base circle usually comes between the pitch line and the dedendum circle, and since the tooth curves below the base circle are radial lines, we would have weak teeth, in the driven pinions at the root, if we made the dedendum greater than standard to suit a longer than standard addendum of the driving pinion.

If the driven gear is larger, it would be possible to increase the dedendum, say to a point where the dedendum circle would approach the base circle, with corresponding increase in addendum of the driving pinion. This increase of addendum is limited to that causing interference, or giving an undesirable degree of tooth pointedness.

*Chief engineer Woodard Machine Co., Wooster, Ohio.

It may be desirable in certain instances to increase the addendum, thus, over the standard, with these limitations. For given circular pitches, then, the arcs of action should be maintained as before. It remains then to determine the length of addenda of the driven gear, *add. B*, (Fig. 13) to make the arc of approach $K'T$ = previous total arc of action minus TK.

This addendum would be equal to that referred to the driving pinion, were TK made equal to TK'. Then $K'T$ = (previous arc for given circular pitch) — TK.

And, substituting in the original equation for addenda relative to arcs of action, we obtain the addendum for condition of equal addenda which will equal *add. B*. This addendum + the usual clearance of $\frac{0.157}{dp}$ = dedendum, *ded. A*.

Referring to Fig. 2.*

$$TK = TK' = \frac{\sqrt{(PA)^2 - (MA)^2} - AT \sin 20^\circ}{\cos 20^\circ}$$

Taking again the example of a 20 in. pitch diameter pinion, 20 deg. involute, let previous arc of action = $P.A.A.$

TABLE VI

	Number of Teeth				
	8	12	16	20	30
1—Diametral pitch	0.4	0.6	0.8	1.0	1.5
2—Circular pitch.	7.85 in.	5.24 in.	3.93 in.	3.14 in.	2.09 in.
3—Standard addendum $\left(\frac{1}{dp}\right)$	2.5 in.	1.67 in.	1.25 in.	1.0 in.	0.67 in.
4—$P.A.A.$*	7.8 in.	5.65 in.	4.35 in.	3.65 in.	2.50 in.
5—Arc of action..	10.28 in.	7.42 in.	5.88 in.	4.9 in.	3.45 in.
6—KT (½ arc of action)† ...	5.14 in.	3.71 in.	2.94 in.	2.45 in.	1.72 in.
7—$K'T$ [(4) — (6)]	2.66 in.	1.94 in.	1.41 in.	1.2 in.	0.78 in.
*For condition of equal addenda:***					
8—PA	11.01 in.	10.68 in.	10.44 in.	10.36 in.	10.22 in.
9—Addendum B..	1.01 in.	0.68 in.	0.44 in.	0.36 in.	0.22 in.
10—Clearance $\left(\frac{0.157}{dp}\right)$	0.5 in.	0.33 in.	0.25 in.	0.20 in.	0.13 in
11—Dedendum A [(9) + (10)]	1.51 in.	1.01 in.	0.69 in.	0.56 in.	0.35 in.
12—Height [(11) + (3)]	4.01 in.	2.68 in.	1.94 in.	1.56 in.	1.01 in.
13—Dedendum B [(3) + (10)]	3.0 in.	2.0 in.	1.5 in.	1.2 in.	0.79 in.

*From curve 1 of Fig. 5, and line 8 of Table II.

†For addendum of line 3, the arcs of action being taken from curve 1 of Fig. 5.

**$KT = K'T$; solve for resulting addendum (of the driven gear); $PA = \sqrt{TK \cos 20^\circ + AT \sin 20^\circ)^2 + (MA)^2}$ and AT = 10 in. = pitch radius.

Line 9 gives the addenda of the driven gear to give the arcs of action (line 4) with the pinion standard addenda as in line 3 for the circular pitches of line 2. For curves based on this table see Fig. 14.

These proportions of the pinion tooth, where we have short dedenda, will, in practically all cases, give good width, without undercut at the root of the tooth, since the root or dedendum circle is very close to the base circle.

As previously mentioned, in the case of a driven gear having a small number of teeth (say, the same number as in the pinion), although there is the same thickness at the root of the tooth as in ordinary standard gearing where the dedendum $= \frac{1.157}{dp}$, these proportions may give too much undercut. It may then be desirable to re-proportion the teeth to provide standard stub tooth length of dedenda, or to a condition of equal addenda for driving pinion and driving gear.

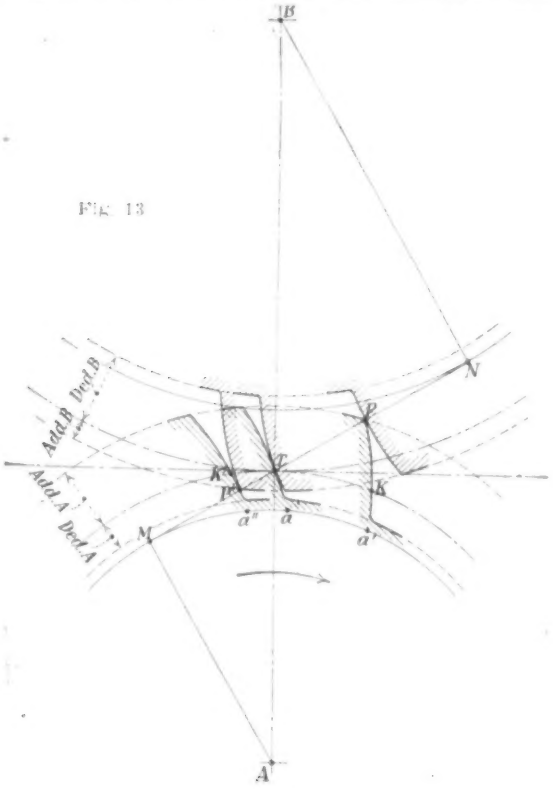
Where there are two pinions of equal pitch diameter and number of teeth, as in the case of rolling mill pinion housings, it is desirable that the pinions be in-

*THE IRON AGE, Dec. 8, page 1469.

terchangeable as to position, and also as to driver and driven; hence, tooth forms of equal addenda are essential.

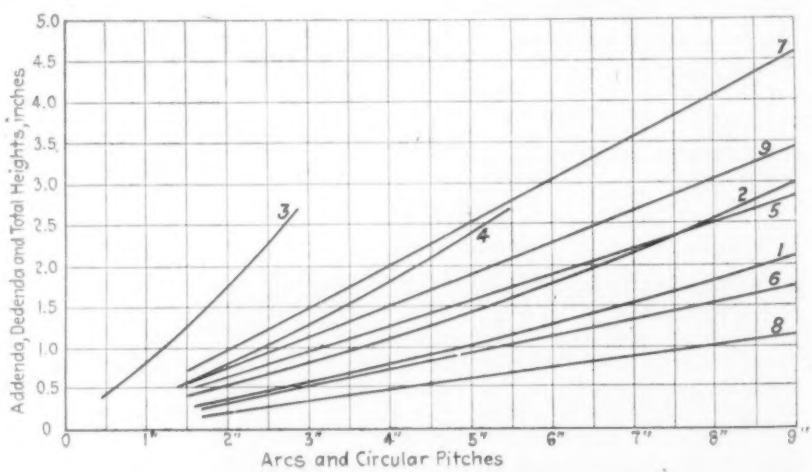
For appreciable ratios, however, the base circle of the gear usually lies well inside of the root circle and no undercut exists. However, since the pitch line of the gear is so much nearer the outside circle than in

Fig. 13



the case of the pinion, this gives a tooth width at the root much greater than in the pinion. The opposite would be preferable, and that the pinion had the thicker teeth. This follows, in view of the fact that the pinion teeth have a greater amount of wear, or times in contact, proportionate to the ratio of reduction. This condition may be corrected by making the pinion teeth

Fig. 14 Shows (1) Arc of Action vs. Addenda, for Equal Addenda on a Pinion of 20-In. Pitch Diameter; (2) Arc of Action vs. Addenda = $K'TK$ vs. Addenda of Pinion; (3) Arc of Approach vs. Addenda = $K'T$ vs. Addenda of Pinion; (4) Arc of Recess vs. Addenda = KT vs. Addenda of Pinion; (5) Circular Pitch vs. Pinion Addenda; (6) Circular Pitch vs. Pinion Dedenda; (7) Circular Pitch vs. Total Tooth Height; (8) Circular Pitch vs. Gear Addenda and (9) Circular Pitch vs. Gear Dedenda



thicker at the pitch line (greater than ½ the circular pitch) to a point of about equal root thickness.

Let us lay down as a rule for the use of the foregoing proportions of teeth, that the base radius of the gear must not be greater than its pitch radius minus the pinion addendum:

or BN may equal or be less than $BT - add.\ A$

or for 20 deg. involute, the minimum pitch radius of the gear $= BT = BT \cos 20° + add.\ A$

$$= 0.9397\ BT + add.\ A$$

$$Add.\ A = BT - 0.9397\ BT = 0.0603\ BT.$$

$$BT = \frac{add.\ A}{0.0603} = \frac{1}{0.0603\ dp}$$

$$\text{Minimum pitch diameter} = \frac{1}{0.03015\ dp} = \frac{33.17}{dp}$$

The examples of the diametral pitches previously used, and corresponding pinion addenda, give the following minimum pitch diameters of the gears.

dp	0.4	0.6	0.8	1.0	1.5	2.0
Add.	2.5 in.	1.67 in.	1.25 in.	1 in.	0.67 in.	0.5 in.
PD	82.9 in.	55.29 in.	41.46 in.	33.17 in.	22.11 in.	16.58 in.

Or for the nearest whole number of teeth:

Pitch diameter	80 in.	53.33 in.	40 in.	32 in.	21.33 in.	16 in.
Number of teeth	32	32	32	32	32	32

Thus we find that for any dp, 32 teeth constitutes the least number for the driven gear, using the foregoing method of proportioning teeth.

Comparing the total heights of teeth for teeth of these proportions and teeth of the foregoing proportions for equal addenda, of total heights based on addenda in line 7, Table II vs. height, line 12 of Table VI, we can show them to be practically identical, as in Table VII.

TABLE VII

Diametral Pitch	Height (2)	Height (3)
0.4	4 in.	4.01 in.
0.6	2.69 in.	2.68 in.
0.8	2 in.	1.94 in.
1.0	1.61 in.	1.56 in.
1.5	1.07 in.	1.01 in.

(2) = Heights Table II = 2 × add. of line 7 + clearance of $\frac{0.157}{dp}$

(3) = Heights Table VI.

Take an example of the 20 in. pitch diameter, 16-tooth, 0.8 diametral pitch pinion and 40 in. pitch diameter, 32-tooth gear, and lay out the tooth forms to scale, as in Figs. 15 and 16.

Fig. 15 shows the teeth for the example cited, where the thicknesses of the teeth at the pitch line are equal. Fig. 16 shows, for the same example, the thickness of the pinion teeth on the pitch line, greater than that of the gear teeth, the pinion teeth being 55 per cent of the circular pitch and the gear teeth 45 per cent. Variation of these thickness proportions for any particular gear ratio is a matter for the engineer to determine in his design, having in mind the strength and wearing properties of the materials of which the gear and pinion are made.

Helical Angle

With reference to Fig. 10, and noting the relatively heavier normal tooth section for the 23 deg. angle than the 45 deg., it may be argued that the lesser angle is preferable. There is another factor, however, affecting this choice, having in mind that teeth of constant addenda and total height are being considered for any angle. In the usual gear drive used for driving steel mills, etc., there is always considerable end play of the motor armature shaft, caused by fluctuations in the load. Although a flexible coupling is generally used, a considerable amount of this impulse is transmitted to the pinion, tending to create endwise fluctuation.

It is further generally conceded to be the best practice, in rolling mill gear drives, to "anchor" the main gear between thrust collars, which are adjustable to compensate for wear. The pinion, however, should "float" in its bearings, having no side thrust collars. Did the pinion have thrust surfaces, even if adjustable,

it will be seen that, as the thrust surfaces of the main gear wore, a misalinement would be caused between the gear and pinion; the pinion would be crowded over against its thrust collar, with consequent unequal distribution of the tooth load on either "leg" of the helical teeth. Even by adjustment of the pinion thrusts, it is a difficult matter to get exact alinement.

With a "floating" pinion, alinement of the pinion in proper mesh with the gear results inherently, due

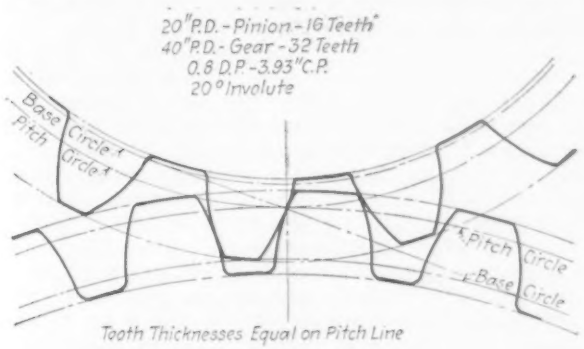


Fig. 15

to the double helix or "V" of the teeth. It may here be also stated that with the most accurately cut gear possible, especially in a drive of large reduction ratio, the line traced through the apexes of the "V" teeth around the gear will not be exactly true, resulting in a tendency to cause the pinion to fluctuate endwise. This may amount to only a few thousandths of an inch, but it is enough to cause uneven tooth pressures, if the pinion is anchored.

It will be readily seen that end play of the pinion, caused by external impulses, is resisted by the "V" of the teeth. For constant amount of backlash (x in Fig.

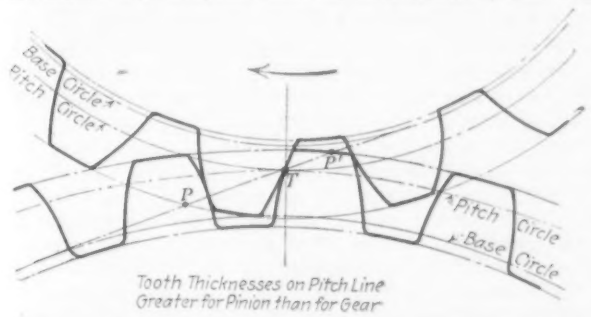


Fig. 16 Shows, Like Fig. 15, a 16-Tooth, 20-In. Pinion Meshing with a 32-Tooth, 40-In. Gear, Both Having 0.8 Diametral Pitch, 3.93-In. Circular Pitch and Being 20-Deg. Involute Gears

17) between the surfaces of the teeth (on section normal to their elements) the possible endwise movement would be (y) where

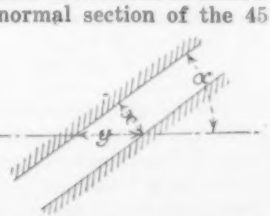
$$y = \frac{x}{\sin \alpha} = \frac{x}{0.39} = 2.56\ x \text{ for } 23 \text{ deg.} = \alpha$$

$$\text{and} = \frac{x}{0.707} = 1.41\ x \text{ for } 45 \text{ deg.} = \alpha$$

The steeper angle has then approximately twice the power to keep the gear and pinion centralized or alined.

Referring to Fig. 10, the normal section of the 45

Fig. 17



deg. tooth (though it is the ordinary standard tooth form) is a little thin, while the 23 deg. section is more stubbed than necessary. The writer believes a compromise desirable, say 30 deg. or even 35 deg., which will give a sufficiently stubbed form, and also have sufficient centralizing or alining effect on the mating gears.

The above discussion, though applying to all double helical gearing, has reference particularly to that used in the heavier drives used in steel mill and similar work. There are several different methods of cutting these teeth, also slight variation in helical angles, though nominally the same angle, when cut in different machines, resulting in the ever present difficulty of cutting a gear or pinion to mesh properly with an existing gear, always exist.

From these considerations the writer believes it impractical to attempt any standard design giving interchangeability, as we have in the involute spur gear system. The engineer will always have, then, considerable leeway in his design, and the above discussion is an attempt to clarify the principles of this design.

We summarize our conclusions, then, as follows:

20 deg. involute teeth.

Helical angle 30 deg. to 35 deg. $= \alpha$.

For 1 : 1 ratios or other ratios having equal addenda in gear and pinion, addendum $= \frac{0.707}{dp}$. (See curve, Fig. 5.)

Where the gear has more than 32 teeth, use the long and short addenda in accordance with curve, Fig. 14.

Minimum width of face $= 2.5\ CP \cot \alpha$.

Increase in Steel Exports from Germany

WASHINGTON, Dec. 13.—An increase of 25 per cent in the volume of iron and steel exports from Germany in September when compared with the average monthly exports for the preceding four months, is shown in a cabled report made to the Department of Commerce, by Commercial Attache C. E. Herring, Berlin. Exports of rolled zinc showed the remarkable increase of 90 per cent, while copper and copper goods increased 16 per cent, and coal 35 per cent. Exports of machinery showed a decrease of 12 per cent. The improvement in the German iron and steel industry, however, is partially offset by labor unrest. Mr. Herring refers to a strike declared on Nov. 14, by 60,000 Dusseldorf metal workers, who demanded an increase in wages. This dispute has been settled by the raising of the average wage level 15 per cent and full work was resumed on Dec. 4. The total production in the metal trade was apparently reduced by 2 per cent during the period of the strike.

Estimated figures for Germany's foreign trade during September and October show that both imports and exports are increasing. Total imports for October are estimated at 3,000,000 metric tons, valued at 13,900,000,000 paper marks, as against 2,500,000 metric tons in September, valued at 10,668,000,000 paper marks. Total exports for October amount to 1,970,000 metric tons, valued at 9,700,000,000 paper marks as against 1,870,000 metric tons in September, valued at 5,519,000,000 paper marks.

Studying Problems of Industrial Mobilization

WASHINGTON, Dec. 13.—An exhaustive study is now being made by the office of the Assistant Secretary of War, based on records of the War Industries Board and the Council of National Defense, in relation to the problem of industrial mobilization, says Secretary of War John W. Weeks, in his annual report in connection with the discussion of the subject of preparedness for national defense. This will form the basis of plans for industrial mobilization to be amplified by the supply branches of the War Department.

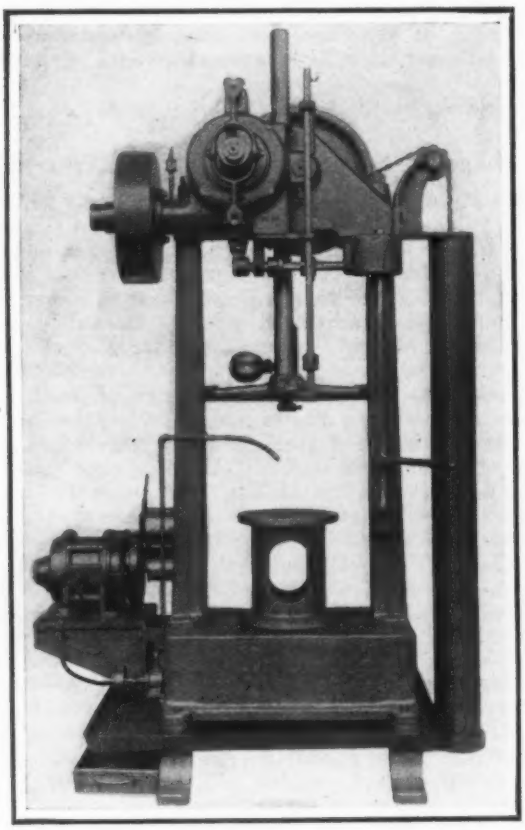
The problem of industrial mobilization has been divided into its elements relating to commodities, labor, power, and transportation. Secretary Weeks points out that there must be the closest co-operation between the technical elements of national defense and the industries of the country. He says that the four most important fields for such development appear to be those relating to mechanical traction and transport on land, explosives production, chemical warfare, and the control of the air. Plans initiated for preparedness of national defense contemplate a more complete state of preparedness than at any period of peacetime in the history of the country, but there remains a great deal to be done.

This subject is dealt with in greater detail by the different bureaus.

New Vertical Broaching Press

A vertical push-broaching machine which is a modification of its power forcing press, a general purpose machine, has been placed on the market by the Lucas Machine Tool Co., Cleveland. Two sizes are regularly made, for 15 and 30 tons capacity, the machine shown in the accompanying illustration being the 15-ton size, equipped with motor drive.

The new machine is said to be modified to increase its usefulness on repetition work, where speed and ease of handling count heavily, by increasing the speed of the stroke and by the addition of a quick power return and lever control. One outstanding field for the machine, it is claimed, lies in the substitution of vertical push broaching for horizontal pull broaching on certain



The Operating Lever on the Rod in Front of Right Hand Column Is Adjustable Vertically for the Operator's Convenience

work, with the advantage of shorter and therefore less expensive broaches; better lubrication of cutting edges of broaches; natural and easy positioning of the work on a horizontal surface; ease of operation; and much less floor space. The machine is also well adapted for production assembling, the lever control and automatic quick return of the ram giving the operator time to take out the finished work and put in a new piece.

The working elements consist of a ram actuated by gearing which is controlled by a friction engaging a worm wheel driven continuously by a worm on the pulley shaft. This friction is controlled by a horizontal operating lever which is adjustable vertically on a rod in front of the right hand column; an arrangement intended for convenience of the operator when either standing or sitting. Moving the lever to the left engages the clutch and starts the ram on its down or pressure stroke. The ram continues to descend until the upper trip on the trip rod strikes a dog on the horizontal shaft connected by bevel gears with the vertical shaft to which the operating lever is attached, which stops the downward movement of the ram. The trip rod is located in front of the ram and is adjustable to operate at any point.

Moving the operating lever to the right starts the ram up, at a quick rate, and it continues until the lower trip strikes the dog, which stops the motion and completes the cycle.

The gage is graduated to register the pressure in tons and provision is made on the gage itself for convenient replenishing with liquid of the reservoir above the plunger. An adjustable friction drive, adjacent to the pulley, has been provided which can be adjusted to any pressure up to the maximum capacity of the press. It consists of asbestos washers between friction disks which are adjusted by nuts outside of the pulley.

In the standard machines the distance between housings is 25 in. and 30¼ in., for small and large machines, respectively. The greatest distance from the base to the end of the ram is 48 in., the height of the base without pan being 12 in. in both cases. The distance from the floor to the top of the base, including pan, is 21 in. The circular broaching stand is 16 in. high and 15 in. in diameter. The speed of the driving pulley is approximately 500 r.p.m. The speed of the ram, power down stroke, is 9 ft. per min. in the small machine and 6 ft. per min. in the larger, the speed on the quick return up stroke being 21 ft. per min. and 15 ft. per min. respectively. The net weights are approximately 2900 lb. and 3800 lb. respectively. A high pattern with vertical capacity of 60 and 72 in. for both sizes is furnished. For electric drive the size of the constant speed motor required is 7½ and 10 hp. respectively, the motor speed recommended being 1200 r.p.m.

Muskegon Foundry Company Will Open New Unit After Jan. 1

The new unit of eight contemplated units of the Campbell, Wyant & Cannon Foundry Co., castings for the automotive industry, will be opened shortly after Jan. 1 at Muskegon, Mich. This will be known as Plant No. 3, Plants Nos. 1 and 2 having been outgrown.

In planning the new foundry sufficient ground was obtained to provide for future expansion and have building sites for employees houses. The company purchased 200 acres and the new plant is one of eight to go on a tract of 80 acres, especially set aside for foundry purposes. There are four acres under roof in the new unit. When placed in operation, the company's total employees will be 3000 and the daily production over 1,250,000 lb. of castings.

A total of 65,000 sq. ft. of glass is used in the roof and side wall sash. The building is 350 x 420 ft. and the roof area is 165,000 sq. ft. The materials yard, 90 x 560 ft., will be served by a 5-ton crane, augmented by an electric magnet. The plant is on the tracks of the Muskegon Belt Line Railroad, which connects with the Pennsylvania, Grand Trunk and Pere Marquette railroads. Twelve cars may be loaded at a time at the 25 x 420 ft. platform.

One hundred and thirty electric motors will be installed; no less than 650 hp. for motors will be needed to supply the required compressed air for molding machines, etc.

The plant was started in Muskegon in 1908, though the three original partners joined in 1905 in Chicago. Though the partners were the sole working force at the start, by the end of the first year 25 were employed.

Models of early electrical illuminating apparatus of a historical and educational value may be placed on display in the rooms of the Edison Pioneers on the ninth floor of the Engineering Societies Building, New York. The Edison Pioneers is described as "an exclusive society, consisting of men who had been intimately associated with Thomas Alva Edison in the early and memorable days of his career." At a recent meeting, the constitution of the organization was revised to provide for a class of membership, known as "descendant members," to consist of the sons and daughters of actual members. Frederick A. Scheffler was elected president. F. A. Wardland is secretary pro tem, room 2077, 50 Church Street, New York.

Steel Revival Depends on Ore Rate Reduction

Chicago Hearing on Upper Lake Iron Ore Rates Brings Out Pointed Testimony from John A. Topping, A. C. Dinkey and Others

"UNLESS the railroads are willing to reduce the cost of transportation, many consumers of Lake ores will be forced out of business or compelled to seek other sources of supply; in other words, the railroads must abandon the policy heretofore followed of exacting all that traffic will bear, and adopt a policy of co-operation, for unless a policy of enlightened selfishness is adopted many steel companies will be unable to live and the carriers will lose much of this highly profitable traffic."

This statement was a salient passage in testimony of John A. Topping, chairman Republic Iron & Steel Co., as the delegated representative of all complainant companies in a hearing before Howard Hosmer, examiner of the Interstate Commerce Commission, which began at the Great Northern Hotel, Chicago, on Dec. 7.

The first hearing on this case was held before the same examiner in Chicago, July 25, but a continuance was granted to give the railroads an opportunity to examine the voluminous cost exhibits put in by the complainants. It was alleged in the complaint that the rates charged for the transportation of iron ore from the various upper Lake ranges to the Lake docks are unreasonable and unduly preferential in favor of the United States Steel Corporation, through its subsidiaries, and unreasonably discriminatory against iron ore as a commodity. The case, designated as No. 12071, Adriatic Mining Co., et al., complainants, versus the Chicago & North Western Railway Co. et al., defendants, concerns 87 iron mining, ore handling, and iron and steel companies. At present there is a blanket rate applying from all of the Lake Superior ranges to docks of $1 a gross ton, including a dock charge of 5c. Prior to the war the rate from the Mesabi and other Minnesota ranges to the docks was 55c., and from Wisconsin and Michigan mines, 45c.

High Freight Rates a Cause of Depression

"The present demoralized and depressed condition of the iron and steel industry of the country is, of course, due to a great many causes," declared A. C. Dinkey, president Midvale Steel & Ordnance Co., at the hearing, "but one of the chief of them is lack of response by the railroads to the call for a liquidation of freight rates." He pointed out that all iron and steel costs other than freight have been materially reduced, and prices have declined to such an extent, in fact, that independents have been showing heavy losses, but that it is unreasonable to expect business to return to anything like normal volume, unless all freight rates, especially those on raw materials, are substantially reduced.

Whereas railroad executives and railroad labor leaders have been stoutly insisting on the maintenance of war freights and war wages, Mr. Topping pointed out in his testimony, steel manufacturers and their employees have already made heavy contributions toward cheaper iron and steel. As evidence he presented comparative composite prices of finished steel, as published in THE IRON AGE, showing that present going quotations are 60 per cent below the war peak and are only 26 per cent above the ten-year pre-war average. His argument is given below:

Statement of John A. Topping

"WHILE general argument will be presented in this case by counsel to show that rate relief should be granted as a matter of equity, may I not point out to your commission and the defendant carriers, as the delegated representative of the complainant companies, some of the business aspects of the iron and steel situation, as related to the economic necessity for restoring not only to the producers but also to the consumers of Lake Superior ores their former competitive situation, in order that the highly profitable traffic of transporting Lake ores may be resumed on more nearly a normal basis.

Lessening Percentage of Lake Ores

"In order that you may have a clear understanding of the competitive situation, it may be stated that, as a result of raw material supplies being developed elsewhere, the country is now less dependent than formerly, upon Lake Superior ores. This fact is clearly evidenced by the great growth of steel production in the East and South, and by the growing importance of the Pacific coast steel industry. See exhibit A.

"In the South, very large iron ore reserves exist, which can be cheaply mined and transported, due to the fact that coal and iron are in close proximity. At tidewater points, high grade foreign ores are now obtainable at considerably less price than Lake ores, as a result of developments in iron mining in Cuba, Chile and Brazil, which ores now supplement supplies heretofore obtained from Sweden, Spain and other points. These foreign ores promise more formidable competition than heretofore, because of the great growth in ocean shipping, with its intensified competition and lower freights. For details of prices at various delivery points, see exhibit F.

"As to the South, it is well known that large extensions to the steel-making capacity could be quickly made available by diverting present pig-making capacity to steel-making purposes. In addition to the menace of this competition of cheaper overseas ore and the cheaper ores from the South, I call your attention to the decreasing requirements for Lake Superior ores, as reflected by the decline in the percentage of Bessemer steel produced, which for many years was the backlog in support of the Lake Superior ore trade.

"The force of this claim is emphasized by an examination of the figures of production for the past 20 years. These figures show that for the year 1900 the Bessemer steel production was approximately 66 per cent of the total steel output, but that production for the year 1920, of Bessemer steel, was only 21 per cent of the total steel output for that period, whereas open-hearth steel increased from 33 per cent to 79 per cent of the total output. It is also significant that while the total steel production since 1900 increased approximately 320 per cent, pig iron—one of steel's raw materials—increased only about 167 per cent, due to the increasing use of scrap iron. For tables of pig iron and steel production see exhibit E.

"Do not these figures eloquently proclaim that the constant increase over the past twenty years in the cost of Lake Superior ores, at various points of consumption, has resulted in driving out of many competitive fields Bessemer steel, and the ores from which this steel is made? Furthermore, do not the figures clearly indicate that non-Bessemer Lake ores are being gradually supplanted by such substitute material as scrap iron and other ore supplies which are being developed elsewhere? While the production of Lake ores has shown substantial growth since 1900, and has increased about 215 per cent, yet this growth is not commensurate with the 320 per cent increase which has taken place in steel production. For details of iron ore production see exhibit B on the next page, a 20-yr. summary.

"The explanation of these figures of production, and of the slower growth indicated by both pig iron and iron

ore, is that in the production of open-hearth steel about 60 per cent of the metallic charge used may be scrap; this leaves only 40 per cent of the charge pig iron. In Bessemer steel-making 100 per cent of pig iron is required. As it takes two tons of ore to produce a ton of pig iron, and inasmuch as a ton of scrap is equal for melting purposes to a ton of pig iron, it will be obvious that an enormous displacement of iron ore by scrap iron results by the manufacture of open-hearth steel. This ore displacement represents not only a direct loss to the Lake ore carriers, but also, through idle blast furnaces and Bessemer steel works, an enormous loss to capital invested, through inability to meet the competition of cheap scrap and the cheaper non-Bessemer ores found outside of the Lake districts.

Exhibit A.—Steel Producing Companies Not Dependent Upon Lake Ores. Data from Iron and Steel Institute Directory, 1920

State	Name of Company	Capacity Gross Tons	
Alabama	Gulf States Steel Co.	288,000	
	Anniston Steel Co.	19,200	
	Tennessee Coal, Iron & Railroad Co.	1,115,000	1,422,200
California*	Southern California Iron and Steel Co.	66,000	
	Judson Mfg. Co.	55,000	
	Pacific Coast Steel Co.	145,000	
	Llewellyn Iron Works.	35,000	301,000
Oregon and Washington	Pacific Coast Steel Co.	115,000	
	Western Rolling Mill Co.	building	115,000
Colorado and Utah	Colorado Fuel & Iron Co.	1,138,000	
	Utah Steel Co.	50,000	1,188,000
			3,026,200
	In addition to the above is the Bethlehem Steel Works, whose present and future raw material basis is Chilean and Cuban ores—annual capacity		3,132,000
	Total tonnage of steel-making capacity, non-dependent upon Lake ores		6,158,200

*[Since the Directory was published the Columbia Steel Co., Pittsburgh, Cal., has added 50,000 tons of open-hearth capacity to supply steel to a bar rolling mill.—EDITOR.]

Open-hearth Cheaper Than Bessemer

"The cause of this revolutionary change in steel process is not due to one but a number of influences, not the least of which is that standard open-hearth steel is cheaper than standard Bessemer, and is as desirable for most purposes and more desirable for many. Open-hearth steel is cheaper to produce, because the long haul on Lake ores is minimized by the use of a larger percentage of scrap, and also because the process admits of the use of cheaper ores of a higher phosphorus content. Such ores are found in many places outside of the Lake region, and while they cannot be used in Bessemer practice, are available for the open-hearth method of steel-making. Furthermore, iron ores used for non-Bessemer purposes, such as are found in Alabama, Colorado, New York and New Jersey, are smelted locally and therefore involve short rail hauls. What is true of the local ores used in open-hearth steel practice is likewise true to a large extent of the scrap iron used, viz., local supplies and short rail hauls. Where foreign ores are used, cheap water transportation recommends their use for economic reasons.

Use of Ore Must Be Stimulated

"As a result of these various influences, the percentage of Lake ores consumed in the production of a ton of steel has been gradually reduced, and will be further reduced unless the Lake ore trade is restored to its former position through reduced cost of transportation.

"In considering the business aspects of the Upper Lake rates of freight on iron ore, it is clearly evident that mutuality of interest should exist between the carriers and shippers, and unless the railroads are willing to reduce the cost of transportation, many consumers of Lake ores will be forced out of business or compelled to seek other sources of supply. In other words, the railroads must abandon the policy heretofore followed of exacting all that traffic will bear, and adopt a policy of co-operation; for unless a policy of enlightened selfishness is adopted many steel companies will be unable to live, and the carriers will lose much of this highly profitable traffic.

"It may be questioned by some whether the scrap supply is sufficient in quantity to maintain the demands being made upon this substitute material by the open-hearth steel producers. My answer to that question is: Scrap to-day is relatively cheaper than pig iron and in abundant supply, and as the steel production of the country increases in total, so will the tonnage of scrap increase in proportion; furthermore, the older our civilization becomes, the more scrap will be made available, as a result of wear and tear on steel products; at least the history of European steel production suggests that scrap supply grows with time.

Liquidation of Steel Values

"As indicating to what extent the steel people have gone, with respect to stimulating business and traffic, in response to the demand for lower cost of iron and steel, I can state without qualification that we have not only liquidated our cost of production over 40 per cent, but in addition thereto have liquidated all profit in production; in fact, most of us, or at least those of us who are entirely dependent upon the common carriers for freight rate protection, are making current losses of such a substantial nature that capital investment is threatened unless quick relief is granted.

Heretofore not only railroad executives, but the union railroad labor leaders, have all stoutly insisted upon the maintenance of war freights and war wages, the railroad executives claiming that freight rates could not be reduced on account of revenue necessities; the labor leaders maintaining that there was no necessity for liquidating labor. The public, however, in no uncertain voice demands a return to lower values in support of lower living costs, and this demand has been very generally met by capital and labor engaged outside of the transportation field. This same public will unquestionably insist upon capital and labor engaged in transportation making a generous contribution to cheaper living costs.

Exhibit B.—Summary of Iron Ore Shipped During Years 1900-1920, as Compiled by the Lake Superior Iron Ore Association

Year	Bessemer	Non-Bessemer	Total Tons
1900	12,020,639	7,059,740*	19,080,379*
1901	12,733,469	7,559,776	20,293,245
1902	17,750,293	9,812,273	27,562,576
1903	15,424,572	8,868,388	24,292,960
1904	14,191,891	7,563,468	21,755,359
1905	20,890,708	13,361,407	34,252,115
1906	22,514,807	15,906,366	38,421,173
1907	23,563,400	18,607,478	42,170,878
1908	13,493,378	12,399,160	25,892,538
1909	18,111,426	24,392,684	42,504,110
1910	19,397,078	23,946,410	43,343,488
1911	15,026,290	17,651,211	32,677,501
1912	20,297,322	27,820,194	48,117,516
1913	19,451,931	30,350,176	49,802,107
1914	12,201,035	20,422,925	32,623,960
1915	15,724,430	31,467,737	47,192,167
1916	22,866,340	43,572,745	66,439,085
1917	22,155,336	42,145,035	64,300,371
1918	20,289,507	42,448,609	62,738,116
1919	15,863,300	32,590,532	48,453,832
1920	19,596,473	40,685,528	60,282,001

*Estimated.

NOTE:—The increased Bessemer production since 1900 is approximately 63 per cent; increased non-Bessemer production since 1900 is approximately 480 per cent; total average increase of both Bessemer and non-Bessemer since 1900 is approximately 224 per cent.

Lower Freight Rates for the Farmer

"I am gratified to observe that this voice has finally been heard and that a 10 per cent reduction in freight rates on farm products has been recommended by rail-

road executives, which, while the amount is small, is a move in the right direction.

"If relief to the farmers is necessary to restore normal activity of farm products and normal prosperity to the farmer, it is equally important to consider broad, general relief measures not only for the iron ore trade, but generally the iron and steel trade, because our business is notably a key industry, and to a large extent the prosperity of many other industries depends upon steel prosperity and steel prices. The carriers themselves will be enormously benefited by cheaper steel; the building trade, now stagnated, will be quickened into greater activity; the makers of agricultural machinery, whose plants are now mostly idle because the farmers demand cheaper machinery, will be enabled to resume operations on a lower cost basis, and many other industries dependent upon iron and steel likewise stimulated into greater activity. On the other hand, unless rail freight reductions are made, iron and steel prices must be advanced, because we cannot indefinitely conduct our operations at a loss, as we are now doing.

"As previously stated, steel manufacturers and their employees have already made heavy contributions toward cheaper iron and steel, by drastic liquidation of not only their profits, but labor cost as well. Iron and steel prices have been reduced approximately 60 per cent, current prices averaging less than 26 per cent above the pre-war 10-year average; in fact, current prices represent a loss in production of from $5 to $10 per ton, notwithstanding labor costs have been reduced about 46 per cent below the war level. I submit herewith price data compiled by THE IRON AGE. See exhibit C.

"As compared with these figures, freight rates both in and outbound are about 90 per cent above 1913 rates; in fact, at current prices for steel-making pig iron (approximately $20 per ton) freight charges represent about one-half of the pig iron value. As an illustration of what this freight increase means, I would state that our company (Republic Iron & Steel Co.) disbursed for the year 1913, on account of inbound freights, $4,033,000, while in 1920 it paid approximately $7,610,000—both years' freights applying on a tonnage slightly in excess of 5,000,000 tons.

Steel as a Large Freight Maker

"As our company produces about 1,000,000 tons of steel per annum, these figures indicate that for every ton of outbound shipments the railroads receive five tons of inbound freight, or in other words obtain six tons of freight for every ton of steel we produce. With our freight charges nearly doubled on five tons of inbound supplies, required in the production of one ton of outbound finished product, and iron and steel prices 60 per cent below the peak, current losses are easily accounted for. In this connection I submit as exhibit D the income statements of three of the larger so-called independent steel companies, which rely entirely upon the common carriers for their transportation, as they do not conduct railroad operations in connection with their steel-making operations.

"When it is considered that all these companies are fully integrated and own their own supplies—iron ore and coal—and to some extent vessel interests on the Great Lakes, and that these companies have been able under pre-war conditions to operate profitably, but are unable to do so under existing conditions, it would seem obvious that with management unchanged and facilities no less favorable than heretofore, the explanation for their current excessive losses is to be found in the unfair freight burdens now imposed.

"While the condition of the larger independent companies is difficult, it will appear obvious that the many smaller companies, without the advantages of integration, and which do not own their own raw materials, are even more seriously affected. It is equally obvious that iron and steel plants wholly dependent upon rail transportation for both coal and iron ore are greater sufferers from war freights than are those plants which enjoy the benefits of river and lake transportation, or those which control or own railroad transportation.

"It should be apparent to this commission and the defendant carriers, therefore, that unless fair competitive conditions are restored, through freight rate reductions, and fair readjustments of differentials, many large consumers of Lake ores will be driven out of business, in which event the railroads will not only be enormous losers but heretofore prosperous communities will also go into decay.

Export Trade and Lower Freights

"I would also call attention to the necessity for cheapening steel production, through cheaper transportation charges, in support of the export trade for iron and steel, for it will require the fullest co-operation between transportation interests and the steel producers to maintain foreign trade connections established during the past ten years. In normal times about 10 per cent of our total capacity has been exported; today, owing to the growth of production, which was stimulated by war necessities, I estimate we have not less than 25 per cent of our present capacity available for export. This surplus estimate is based upon a full home demand. Current exports are running not far from 3 per cent of our total capacity. Current sales abroad are being made at losses far in excess of what the business justifies us in accepting, and these current sales in foreign markets are being continued only with the hope that we will be relieved of part of the burden of maintaining this business by lower costs brought about through reduction in freights.

"The problem before us is a big one, but should be worked out to the satisfaction of all interests by intelligent study and co-operation. More nearly pre-war conditions must be re-established, particularly with respect to the restoration of fair differentials between the various producing districts, and by such reductions in freight rates as will put all iron and steel districts on a fairly competitive basis. To do this, due regard will have to be given to all competitive influences, water competition not excepted.

Freight Reductions Should Come Soon

"Shippers generally realize that cost of conducting transportation is abnormal and must be liquidated, otherwise normal freights cannot be re-established. We also believe, however, that the railroads should not

Exhibit C.—"Iron Age"

records show composite price of finished steel:

July, 1917 @ $5.334 per 100 lb.
Nov., 1921 @ 2.113 per 100 lb.
10-year pre-war average 1.684 per 100 lb.

Present prices are 60 per cent below "peak," and are only 26 per cent above 10-year pre-war average.

Average Grades Pig Iron

July, 1917, @ $52.19 per ton
Nov., 1921, @ 19.81 per ton
10-year pre-war average 15.72 per ton

Present price is 62 per cent below "peak," and about 26 per cent above 10-year pre-war average.

Exhibit D

	1921 Republic Iron & Steel Co. Quarters			1921 Lackawanna Steel Co. Quarters			1921 Midvale Steel & Ordnance Co. Quarters		
	1st	2d	3d	1st	2d	3d	1st	2d	3d
Net earnings, after provision for all taxes	$521,497	*$153,574*	*$1,037,743*	$667,695	*$184,762*	*$580,936*	$536,577	$571,524	$688,238
Interest	184,244	224,269	194,319	260,038	258,891	258,516	760,287	755,439	745,048
Depreciation, etc.	232,642	205,830	166,348	398,922	339,474	368,823	1,171,492	1,105,478	1,192,326
Profit or *deficit*	$104,611	*$883,673*	*$1,398,410*	$8,735	*$983,127*	*$1,208,275*	*$1,395,202*	*$1,289,393*	*$1,249,136*

delay a start toward normalcy, but should immediately revise their commodity schedules as much as possible. If this revision involves wage reductions, make them effective, as lower wages generally prevail in all trades as a result of lower living costs, and railroad labor should not be exempt.

"The Adamson law as a war measure may have been justified, but is it justified as a peace measure?

Exhibit E.—Production of Steel Ingots and Pig Iron as Compiled by the American Iron and Steel Institute for the Years 1900-1920—Gross Tons

Steel Ingots:

Years	Open Hearth	Bessemer	Crucible	Other	Total
1900	3,398,135	6,684,770	100,562	4,862	10,188,329
1901	4,656,309	8,713,302	98,513	5,471	13,473,595
1902	5,687,729	9,138,363	112,772	8,386	14,947,250
1903	5,829,911	8,592,829	102,434	9,804	14,534,978
1904	5,908,166	7,859,140	83,391	9,190	13,859,887
1905	8,971,376	10,941,375	102,233	8,963	20,023,947
1906	10,980,413	12,275,830	127,513	14,380	23,398,136
1907	11,549,736	11,667,549	131,234	14,075	23,362,594
1908	7,836,729	6,116,755	63,631	6,132	14,023,247
1909	14,493,936	9,330,783	107,355	22,947	23,955,021
1910	16,504,509	9,412,772	122,303	55,335	26,094,919
1911	15,598,650	7,947,854	97,653	31,949	23,676,106
1912	20,780,723	10,327,901	121,517	21,162	31,251,303
1913	21,599,931	9,545,706	121,226	34,011	31,300,874
1914	17,174,684	6,220,846	89,869	27,631	23,513,030
1915	23,679,102	8,287,213	113,782	70,939	32,151,036
1916	31,415,427	11,059,039	129,692	169,522	42,773,680
1917	34,148,893	10,479,960	126,716	305,038	45,060,607
1918	34,459,391	9,376,236	115,112	511,693	44,462,432
1919	26,948,694	7,271,562	63,572	387,404	34,671,232
1920	32,671,895	8,883,087	72,265	505,687	42,132,934

NOTE: It will be observed from the above table that the growth of the steel production of the country since 1900 has been 314 per cent.

Pig Iron:

Years	Anthracite	Charcoal	Bituminous*	Total
1900	1,677,048	384,482	11,727,712	13,789,242
1901	1,712,527	383,441	13,782,386	15,878,354
1902	1,115,247	390,169	16,315,891	17,821,307
1903	1,911,347	505,684	15,592,221	18,009,252
1904	1,228,140	337,529	14,931,364	16,497,033
1905	1,674,515	352,928	20,964,937	22,992,380
1906	1,560,686	433,007	23,313,498	25,307,191
1907	1,371,554	437,397	23,972,410	25,781,361
1908	355,009	249,146	15,331,863	15,936,018
1909	698,431	376,003	24,721,037	25,795,471
1910	649,082	396,507	26,257,978	27,303,567
1911	229,575	278,676	23,141,296	23,649,547
1912	247,179	347,025	29,132,733	29,726,937
1913	300,041	339,981	30,326,130	30,966,152
1914	91,464	263,924	22,976,856	23,332,244
1915	84,753	296,152	29,535,308	29,916,213
1916	217,788	372,411	38,844,598	39,434,797
1917	381,048	376,525	37,863,643	38,621,216
1918	283,592	348,877	38,422,175	39,054,644
1919	138,337	327,097	30,549,930	31,015,364
1920	302,567	323,396	36,300,024	36,925,987

*Coke.

NOTE: It will be observed from the above table that the growth of the pig iron making capacity of the country since 1900 has been 176 per cent.

GENERAL REMARKS: The iron ore displacement which has taken place since 1900, as reflected by the production figures above noted, is clearly emphasized. Growth in pig iron production since 1900 has been 176 per cent, whereas the increased output of steel was 314 per cent.

For it is well known that the effect of this law has been to establish a basic eight-hour day, rather than eight hours of work, and as a result does not shorten the day's work, but does lengthen the day's pay.

"While it is a matter of history that the iron and steel industry of this country was founded upon Lake ores, and is now largely dependent upon these raw materials, yet, as heretofore pointed out, Lake ores are being rapidly displaced by various other raw materials, exclusive of scrap, as evidenced by the steel producing capacity of the Pacific Coast, Rocky Mountain districts, Alabama and the Atlantic seaboard, which sections now produce approximately 6,160,000 tons per annum. As the iron mines of the districts named contain large reserves, the potential producing capacity of these districts is largely in excess of their present capacity.

"Aside from the competition within our borders, the Canadian steel production has now reached a total of approximately 1,500,000 tons per annum and is also subject to large extension. It should be apparent, therefore, that the effect of all this competition has been and will be to localize the influence of Lake ores by narrowing the markets for iron and steel products produced from them, unless fuller consideration is now given the weakness of our present competitive position by reductions in freight on Lake ores, and also by reductions in freight on iron and steel products generally, in order that all our markets may be broadened and demand stimulated; for it should not be overlooked that iron ore moves only in response to the demand for pig iron and steel, and that the demand for these products is dependent upon our ability to maintain prices low enough to encourage the maximum use of these materials.

"If this economic principle is accepted—that high prices discourage and low prices stimulate demand—then the only question at issue is, to what extent the railroads should immediately reduce freight charges. As to their ability to make a substantial start toward liquidating transportation charges on iron ore and iron and steel products, there is but little doubt, in view of the gradual reductions being made in railroad operating costs, which are reported by the Bureau of Railroad Economics, for October, to show a reduction of 24.2 per cent.

Railroads Fare Well by Comparison

"Another authority, *Wall Street Journal*, reports that October railroad income shows about 5 per cent earned on the total valuation of the roads, and that the amount earned was about 85 per cent of what the Transportation Act set up as a fair basis for capital return. This same authority estimates that the railroad returns for the year 1921, notwithstanding the poor showing made in the early part of the year, will average close to 3½ per cent on total railroad valuations. While it may be conceded that railroad profits are in no sense excessive, based on their average showing for this year, yet by comparison with the financial showing of the steel companies, the railroad position is one of affluence, as the steel people would be well satisfied to be able to earn 5 per cent on their total property values. Under present prospects, however, there is no hope of any profit, as we see no escape from continued losses which are currently averaging from 5 per cent to 10 per cent on invested capital. The present condition of the iron and steel business is one of extreme depression, and while some improvement has been made with respect to a slightly increased demand, it is the general opinion of most of us that further improvement will undoubtedly be slow and that further readjustment must be made before a return to normal conditions can be hoped for.

"How far we are from a normal demand is suggested by the present rate of consumption of pig iron per capita, which is approximately 280 lb.; in other words, the rate of consumption has dropped back to the rate approximate for the year 1896, at which time the population was 70,000,000, as compared with the present population of approximately 110,000,000.

Exhibit F.—Prices of Foreign and Lake Superior Iron Ores Delivered at Various Eastern Points in 1921

Point of Delivery	Foreign Ores: Average Price C.I.F. Atlantic Ports	Foreign Ores: Freight* from Nearest Port	Foreign Ores: Delivered Price	Lake Superior Ores: Lake Erie Price	Lake Superior Ores: Freight* from Nearest Port	Lake Superior Ores: Delivered Price	Net Margin in Favor of: Foreign Ores	Net Margin in Favor of: Lake Superior Ores
Sparrows Point	$5.46	....	$5.46	$5.80	$2.31	$8.11	$2.65	
Chester	5.46	$1.12	6.58	5.80	2.24	8.04	1.46	
Wharton	5.46	1.26	6.72	5.80	2.24	8.04	1.32	
Bethlehem	5.46	1.40	6.86	5.80	2.24	8.04	1.18	
Coatesville	5.46	1.26	6.72	5.80	2.24	8.04	1.32	
Reading	5.46	1.54	7.00	5.80	2.24	8.04	1.04	
Lebanon and Harrisburg	5.46	1.68	7.14	5.80	2.24	8.04	.90	
Johnstown	5.46	2.66	8.12	5.80	1.53	7.33		$0.79
Earlston	5.46	2.66	8.12	5.80	2.01	7.81		.31
Pittsburgh	5.46	2.80	8.26	5.80	1.36	7.16		1.10

*Based on rates in effect prior to Oct. 20, 1921.

NOTE:—From data furnished by the Midvale Steel & Ordnance Co.

"The limited demand for pig iron fairly reflects conditions in the steel trade, as the current production of steel ingots does not exceed 40 per cent of capacity. Financial statements of the independent iron and steel companies, as previously stated, indicate that they have gone as far as is possible for them to go, through sacrificing profits by reduction in prices, to stimulate demand, and it is clearly up to the railroads to make the next move. Any temporary sacrifice of profits which the carriers may make, through reduction in freight rates, will unquestionably be more than offset by an increased volume of business; and when it is considered that the most profitable business which the carriers have is the long haul and highly profitable iron and steel traffic, it is at least debatable whether reductions in freight rates on iron and steel commodities would prove to be a sacrifice, or rather a move in the direction of increasing railroad profits."

Statements of A. C. Dinkey and Others

PRESIDENT A. C. DINKEY, president Midvale Steel & Ordnance Co., submitted the following:

"The present demoralized and depressed condition of the iron and steel industry of the country is, of course, due to a great many causes, but one of the chief of them is lack of response by the railroads to the call for a liquidation of freight rates.

"In the iron and steel costs other than freight, and in the prices charged, the liquidation that has taken place can be shown by examining two items, viz., commodity prices and wage rates. After the armistice and in the early part of 1920, the price for structural steel and bars was 2.65c. per lb.; to-day it is 1.50c., a decline of approximately 43 per cent. The wage rate declined from 46c. per hour for common labor to 25c., equal to 46 per cent. In the case of our own company, which is one of the best equipped of the so-called independents, our loss for the first three quarters of this year is $3,933,000, and this is typical of other steel companies which depend upon the sale of steel only for their final profit or loss.

Five Tons of Inbound Freight for Every Ton of Outbound

"The steel industry is more intimately tied up with transportation facilities and transportation costs than any other basic industry, due to the fact that it employs and moves five tons of inbound freight for every ton of outbound freight. Thus, in the sale of every ton of finished steel, the railroads secure six tons of revenue producing freight.

"In my judgment, it is unreasonable to expect business to return to anything like normal volume unless all freight rates, especially on raw materials, are substantially reduced. No business can revive which, like the iron and steel industry, is on an unprofitable basis because of excessive transportation costs.

"The freight cost in a ton of steel at Johnstown in 1914 was $6.83. In 1921 it is $12.52.

"The ore rate under discussion was 63½c. when the Railroad Administration took charge; it now is $1. This $1, for the reason that we use approximately two tons of ore in every ton of steel, represents $2 of the $12.52 freight cost in steel. In all good conscience and fair treatment, this rate should be materially reduced."

Testimony of Ore Selling Firms—Rates on Old Range

The mining, ore selling and pig iron selling organizations were represented by Col. F. B. Richards, M. A. Hanna & Co., Cleveland; H. G. Dalton, Pickands, Mather & Co., Cleveland; W. G. Mather, Cleveland-Cliffs Iron Co., Cleveland; Seymour Wheeler, Pickands, Brown & Co., Chicago, and others. Part of the testimony had to do with an intervention by witnesses for interests on the Gogebic range, who brought out that the carriers had been assessing a rate of 85c. a ton on all mines in Gogebic territory to docks at Ashland, but subsequent thereto their freight was increased to $1, which was allowed to become effective by the commission with the express understanding that the carriers justify it at this hearing. Gogebic shippers, however, contend that the 85c. rate is itself too high for the service performed on the ore, and testified as to the advantages of their location which, they believe, entitle them to a lower rate than the other ranges have. Representatives of the Menominee range also submitted testimony on the advantages of their location and contended that any rates that were fixed for application to the Gogebic range should also apply to the Menominee mines. After the depositions of the complainants had been taken, representatives of the railroads presented testimony to show the costs involved in handling ore traffic.

Conveyors Corporation Makes Cast Iron Storage Tank

The American cast iron storage tank, designed not to hold liquids but for dry storage purposes, has been developed by the Conveyors Corporation of America, Chicago. Among materials considered for storage are ashes, coal, building materials, foundry supplies, such as coke and sand; chemicals and allied raw materials, such as granular fullers earth, gilsonite, kieselguhr, bauxite, potash, animal charcoal—in general loose, bulky materials that are ordinarily stored in silos, tanks, hoppers and bins.

Of the advantages enumerated for the cast iron storage tank emphasis is placed on its long life and low maintenance costs. Cast iron tanks resist corrosion, abrasion and rust. They are easy to erect, an unskilled workman, it is pointed out, being able to do the work.

It is cylindrical in shape, erected on a 5 in. reinforced concrete slab. It is supported on a structural base or tower, built up of standard fabricated structural shapes. The body of the tank is built up of cast iron radius plates, held vertically between cast iron H-sections. The tank can be built to any convenient height.

To Reduce Unemployment

The following statement has been made by the General Electric Co. to employees of its Schenectady plant:

Co-operating with Schenectady's unemployment committee, the General Electric Co. announces that necessary steps have been taken to afford employment to part of its men who are out of work or may be thrown out of work by the prospective discontinuance of its naval program. The management of the Schenectady Works has decided to build a substantial amount of apparatus for stock and in anticipation of future sales. This work will be largely in the nature of large apparatus and is designed to take the place of Government work now in the shops.

The company will also arrange to have a considerable amount of repair work and maintenance work done during the winter months which under other conditions would be deferred.

These actions have been taken by the General Electric Co. to help relieve the unemployment situation in Schenectady during the coming winter and will necessarily be confined to employees of the Schenectady Works who are either now working only part time or who have been temporarily laid off on account of lack of work.

The city of Philadelphia is building a forge shop and foundry for its water department of a complete character, judging from the equipment to be provided in them. The general contract for this work, which has been awarded to F. J. Ryan & Co., industrial engineers, Philadelphia, covers forges, billet heating furnaces, treating furnaces, core ovens, brass furnaces, lead furnaces, pumping and air pressure system and an oil-burning system for the heating boilers of the plant.

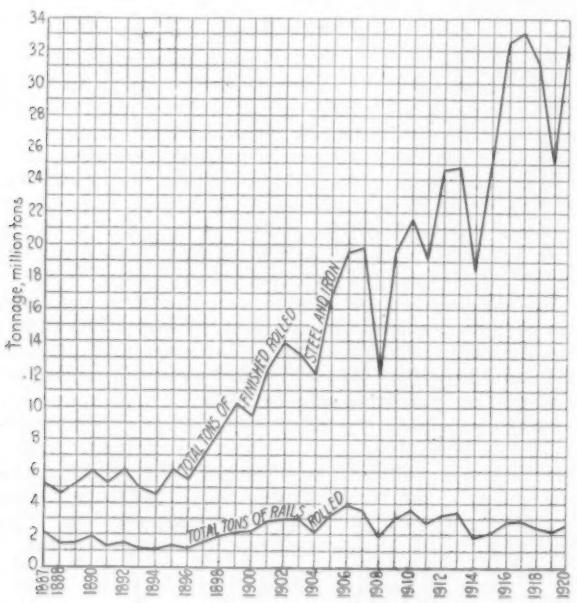
The International Harvester Co., is re-opening its motor truck plant at Springfield, Ohio, and expects shortly to turn out 25 speed trucks a day. About 250 men will be employed. The plant has been closed down since last July.

EVOLUTION OF THE HEAVY RAIL

Progressive Changes in Design of the Dudley 80-lb. to 120-lb. Rail—Effect on Their Life

The use of steel rails of heavier section has been a feature of the rail policy of the leading railroads for the past 15 years or so. Various causes have brought this about, particularly heavier locomotives, cars and rolling stock. In the earlier days, 65-lb. to 85-lb. rails were the rule, but now most of the leading lines have adopted the 100-lb. or 105-lb. as the standard rail. For special conditions a heavier rail, up to 130 lb. to the yard, is in use.

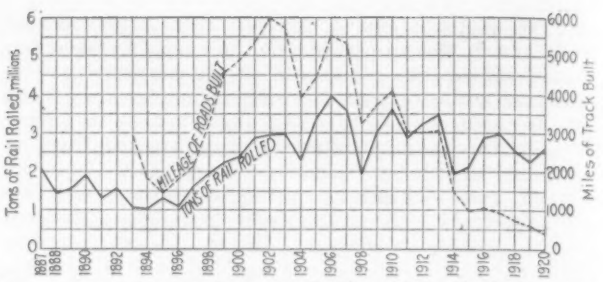
The New York Central Railroad has been one of the pioneers in this development. Illustrative of the gradual modification of the design of these rails, the progressive line drawing reproduced herewith shows in



Total Tonnage of Finished Rolled Steel and Iron Compared with Tonnage of Rails Rolled in the United States, According to Data of American Iron & Steel Institute

detail the various changes introduced by Dr. P. H. Dudley, the company's consulting engineer. In the 5-in. 80-lb. rail, the radius in the top of the head was 12 in. This design produced a rail much flatter than the section in general use at that time. For the 5⅛-in. 80-lb. rail, Dr. Dudley made the radius of the top of the head 14 in., the same as in the 6-in. 100-lb. rail. The difference in the widths of the heads at the lower or under surface of the head of each particular section is a feature. The 6-in. 100-lb. rail was not put into service in the Grand Central Station until 1895, which was also the date of the 5⅛-in. 80-lb. rail.

Dr. Dudley states that in switching service he has observed that the head of the 6-in. 100-lb. rail out-



Comparison of Rails Rolled and Miles of Track Built in the United States

wears practically three heads of the 5⅛-in. 80-lb. rail, and this he regards as a very important fact. On the Pennsylvania division of the New York Central, under 60,000,000 tons of mineral load or traffic per year, the 6-in. 100-lb. rail wears out 2.7 of the heads of the 5⅛-in. 80-lb. rail. The same ratio applies in general to the 105-lb. rail.

Two charts are reproduced which strikingly show the wide difference between the rail production and the finished steel output over a period of years as well as the similar divergence between the mileage of roads built in the United States and the tons of rails rolled over a similar period of years. Lack of new track construction in the past few years has reduced rail demand by several hundred thousand tons.

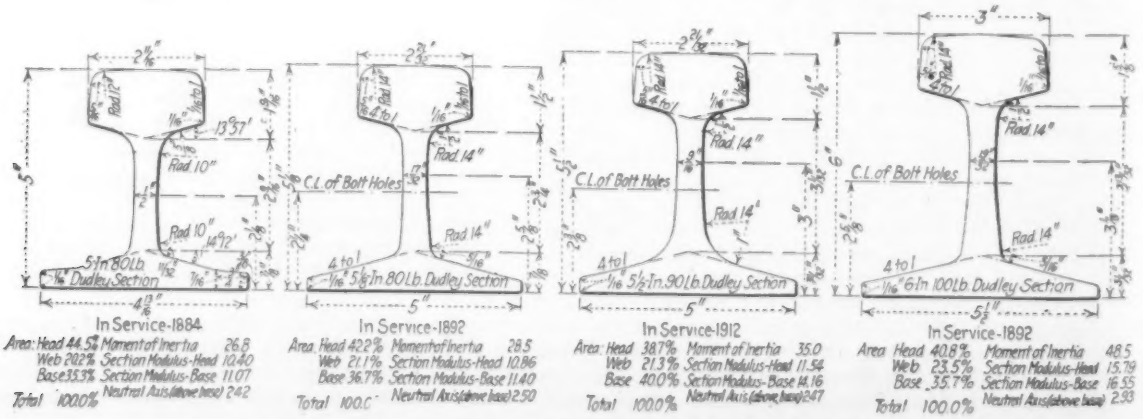
It is also the belief of Dr. Dudley and his associates that one reason for the drop in the rail production and in railroad demand for rails is the longer life of the heavier rail as compared with that of the lighter one. This influence gradually has been accumulating for the last 20 years, but the effect is more pronounced in more recent years.

Gases in Metals

Aside from the more or less familiar importance of gases as related to the deoxidation of steel and the production of sound ingots and castings, many operations in refining, working, and treating of metals are vitally concerned with the action or effect of various gases.

Many of the inherent differences in quality of steels made by different processes are generally attributed to the amounts and compositions of the gases with which the metal is in contact when in the molten state in a converter, open-hearth or electric furnace, or in a crucible. It is reported that steel converters operating in a vacuum have recently been successfully used on a commercial scale in England to produce cutlery steel of unusually fine quality. The presence and nature of occluded gas in cast iron has been said to be closely connected with two important characteristics of such material, namely, the graphitization of cast iron and the growth of gray cast iron.

Of no less importance are dissolved or occluded gases in non-ferrous metals, says the Bureau of Standards. For example, the fire-refining of copper is wholly a matter of intentionally dissolving a gas



Various Stages in the Changes in Design of the Dudley Rail from the 80-Lb. to the 120-Lb.

(oxygen) in crude copper and then removing nearly, but not quite, all of this same gas. If the final step of this refining is carried to the complete removal of oxygen, by poling only a minute or two longer than necessary, the whole furnace charge must be entirely reworked as if it were a fresh charge of crude copper.

In the working and fabrication of copper, gases must be again considered. Operations involving the cleansing of steel or iron by pickling in acids must be followed by treatments designed to remove hydrogen taken up from the metals by the gases. If not removed, this occluded gas will make the metal too brittle to work, or will give trouble in subsequent operations when the metal is exposed to heat, as, for instance, causing blisters in enamel. Occluded gases have also been shown to have a marked effect on the electrical conductivity of metals, their magnetic properties, their consistency in dimensions, as well as their mechanical properties.

Small Decrease in Corporation's Unfilled Orders

Unfilled orders on the books of the United States Steel Corporation, Nov. 30, were 4,250,542 tons, compared with 4,286,829 tons on Oct. 31, a decrease of 36,287 tons. This decrease compares with one of 273,841 tons in October, an increase of 28,744 tons in September, and decreases of 298,398 tons in August; 287,544 tons in July; 364,619 tons in June; 362,737 tons in May; 439,541 tons in April; 649,102 tons in March; 639,297 tons in February and 574,958 tons in January. The unfilled tonnage a year ago was 9,021,481 tons, or 4,770,939 tons more. The table below gives the unfilled tonnage at the close of each month, beginning with January, 1918:

	1921	1920	1919	1918
Jan. 31	7,573,164	9,285,441	6,684,268	9,477,853
Feb. 28	6,933,867	9,502,081	6,010,787	9,288,443
Mar. 31	6,284,765	9,892,075	5,430,572	9,056,404
Apr. 30	5,845,224	10,359,747	4,800,865	8,741,882
May 31	5,482,487	10,940,465	4,282,310	8,337,623
June 30	5,117,868	10,978,817	4,892,855	8,918,866
July 31	4,830,324	11,118,468	5,578,661	8,883,801
Aug. 31	4,531,926	10,805,038	6,109,103	8,759,042
Sept. 30	4,560,670	10,374,804	6,284,638	8,297,905
Oct. 31	4,286,829	9,836,852	6,472,668	8,353,293
Nov. 30	4,250,542	9,021,481	7,128,330	8,124,663
Dec. 31	.....	8,148,122	8,265,366	7,379,172

The largest total of unfilled orders was on April 30, 1917, when it was 12,183,083 tons. The lowest was on Dec. 31, 1910, at 2,605,747 tons.

Tin Plate for British Columbia

SEATTLE, Dec. 8.—The entire tin plate order for British Columbia for 1922 was placed by the American Can Co. with British makers for the first time in seven years. The trade was retrieved by the British makers on a reduction in price. The cut in tin plate alone will mean a reduction per case of 75c. The total purchase by the American Can Co. for its British Columbia supply will reach 25,000 tons. The first shipment is to leave the United Kingdom about Dec. 15 for Vancouver.

Gain in November Steel Ingot Output Small

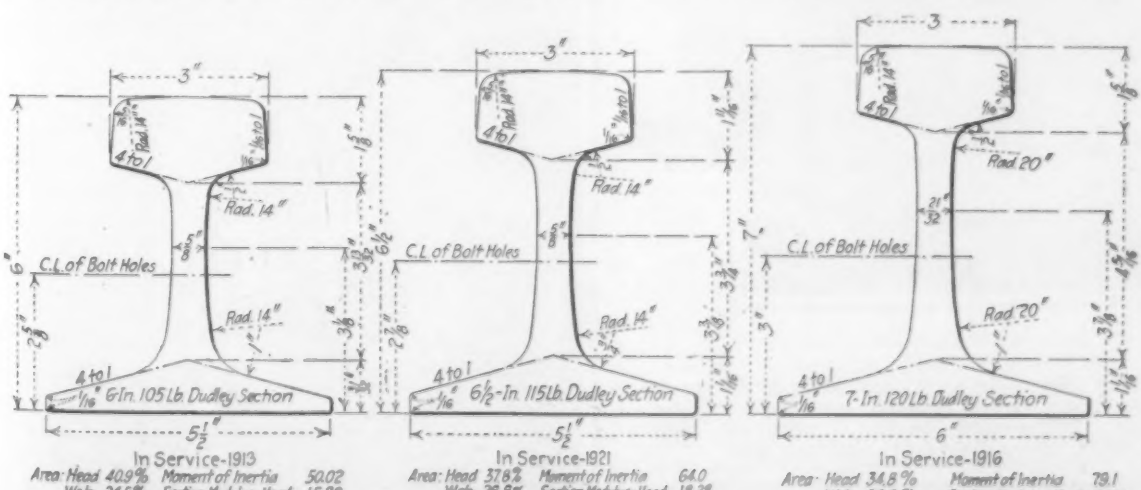
The steel ingot statistics of the American Iron and Steel Institute show that 30 companies, which in 1920 produced 84.20 per cent of the total, had an output in November of 1,660,001 gross tons, as compared with 1,616,810 tons in October and with 803,376 tons in July. The November increase over October was 43,191 tons or 2.67 per cent. The increase in October over September was 37.6 per cent. Estimating the production of other companies on the basis of the 30 reporting (though it is probable the small companies did not equal the rate of the larger ones) the total output of ingots in November was 1,971,497 tons, or 75,826 tons per operating day, counting 26 working days in November, against an estimated total of 1,920,202 tons or 73,854 tons per day in October. This is an increase of 51,295 tons or 1972 tons per day. In the table below the output of Bessemer and open-hearth works is separated and the figures for 1920 by months are included:

Monthly Production of Steel Ingots by 30 Companies Which Produced About 84.20 Per Cent of Total in 1920—Gross Tons

	Open Hearth	Bessemer	All Other	Total
January, 1920	2,242,758	714,657	10,687	2,968,102
February	2,152,106	700,151	12,867	2,865,124
March	2,487,245	795,164	16,640	3,299,049
April	2,056,336	568,952	13,017	2,638,305
May	2,251,544	615,932	15,688	2,883,164
June	2,287,273	675,954	17,463	2,980,690
July	2,135,633	653,888	13,297	2,802,818
August	2,299,645	695,003	5,784	3,000,432
September	2,300,417	693,586	5,548	2,999,551
October	2,335,863	676,634	3,485	3,015,982
November	1,961,861	673,215	3,594	2,638,670
December	1,687,162	649,617	3,586	2,340,365
Total, 1920	26,197,843	8,112,753	121,656	34,432,252
January, 1921	1,591,281	608,276	3,629	2,203,186
February	1,295,863	450,818	2,796	1,749,477
March	1,175,591	392,983	2,404	1,570,978
April	1,000,053	211,755	2,150	1,213,958
May	1,047,810	216,497	1,543	1,265,850
June	808,286	193,644	1,476	1,003,406
July	689,489	113,312	575	803,376
August	915,334	221,116	1,621	1,138,071
September	908,381	265,152	1,207	1,174,740
October	1,269,945	345,837	1,028	1,616,810
November	1,294,371	363,912	1,718	1,660,001
Total, 11 mos.	11,996,404	3,383,302	20,147	15,399,853

The November ingot production was at a yearly rate of 23,581,886 tons, counting 311 operating days to the year. This compares with a rate in October of nearly 23,000,000 tons, in September of nearly 17,000,000 tons, in August of 15,568,660 tons, and in July, the low point, of 11,857,186 tons. The November production was therefore about twice that of July.

The increase of 51,295 tons in the estimated ingot output of all companies in November over that in October compares with an increase of 168,805 tons in the November pig iron output over that of October.



The 120-lb. rail is a special section used only on the viaduct, 100th to 135th streets, New York

Modern Rolling Mills for France

Interchangeability and Labor Saving Are Features—Both Reversing and Three-High Mills Included

AMERICAN built structural mills are being installed by the Société Anonyme des Acieries de Micheville. The entire equipment was designed and built by the United Engineering & Foundry Co., Pittsburgh. The small scale plan shows the layout, which comprises two separate units. The one unit consists of a 44-in. reversing blooming mill, a 36-in. reversing roughing mill, two stands of 28-in. three-high rolls and one stand of 28-in. two-high rolls. This unit will be used as a combination rail and structural mill. The second unit is a light structural mill, known as the "cross-country" type. It consists of one stand of 24-in. three-high rolls, two stands of 20-in. three-high rolls and two stands of 20-in. two-high rolls.

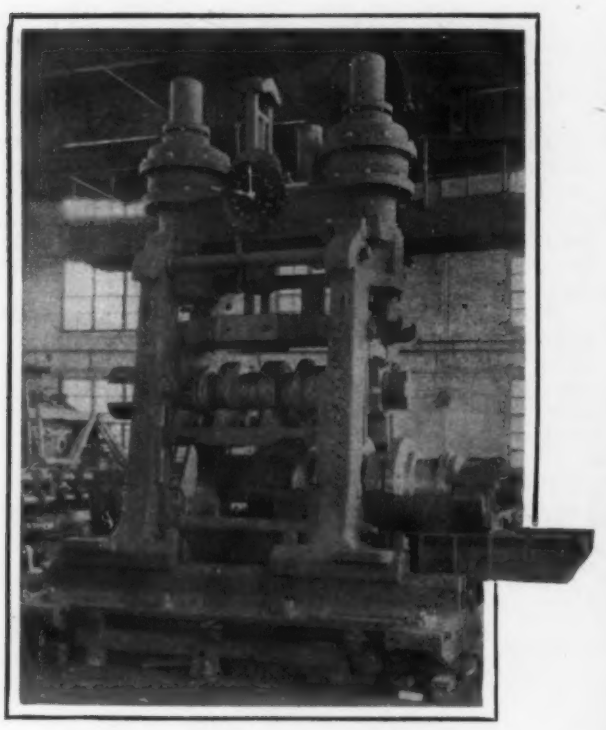
The 44-in. reversing blooming mill has rolls 37 in. in diameter, with body 100 in. long. It is equipped with modern mill tables and manipulator. With the exception of the passes in the rolls, it is an exact duplicate of the 44-in. blooming mill which the same company built for Homecourt, France.

The 36-in. roughing mill has a feature which is new. Large collars are necessary on the bottom rolls to permit rolling blanks for structural beams. This ordinarily means an exceptionally wide window in the housings, or else a removable cap on the housings. It will be appreciated better what this means when it is stated that these collars are frequently 48 to 50 in. in diameter. To overcome these difficulties, the engineers designed a new roll-carrying device for the mill. The bottom roll is mounted in a cradle which can be moved by means of a hydraulic cylinder. One photograph shows this feature very clearly, the bottom roll being shown partly removed. This mill has a screwdown, as it will, at times, be operated as a billet mill. The tables on both sides of the mill are equipped with manipulators for turning and moving the beam blank and rail blooms.

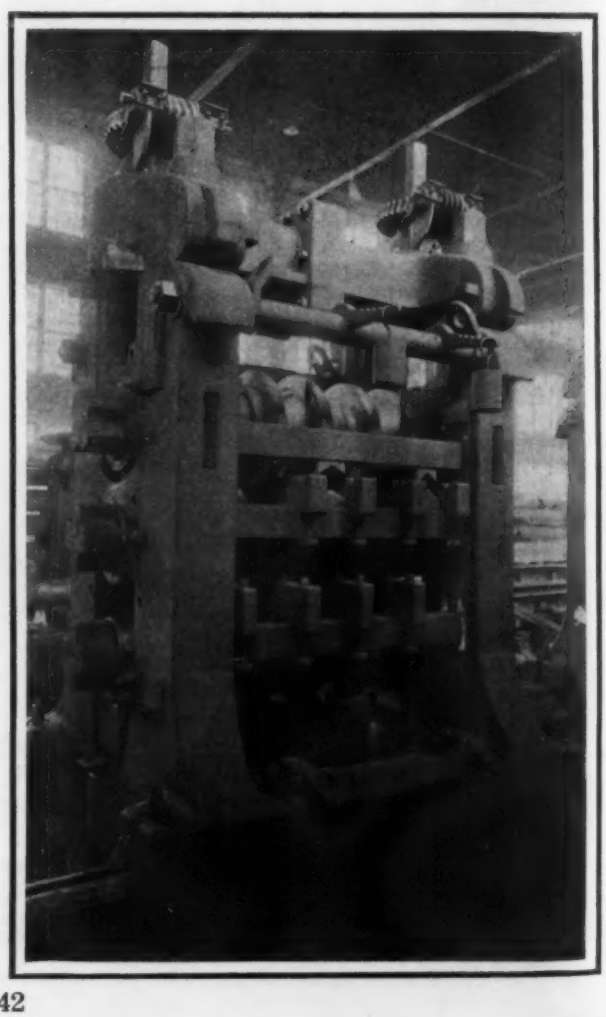
The 28-in. mills are of the standard type, with the housing feet bolted together so that the entire stand can be lifted off the bed plate and another stand substituted. This feature is common in America, as it greatly reduces the time required for changing the mill from one section to another. The United Engineering & Foundry Co. designed the rolls and guide equipment, all of which were fitted in place before shipment. The first stand of the 28-in. mill is equipped with tilting tables fitted with United patent stake manipulators. Table No. 16 is of the composite type, that is, one-half tilting, and the other half stationary.

By these arrangements the rails or structural material being rolled are automatically switched from one pass to another. All the operator has to do is to raise or lower the tables. These refinements not only increase the output of the mill, but reduce the quantity and quality of labor required. The runout table is equipped with a device for hot straightening beams and channels. This materially reduces the amount of cold straightening. The saws, gages, roller tables and hot bed are especially arranged for handling both rails and structural material.

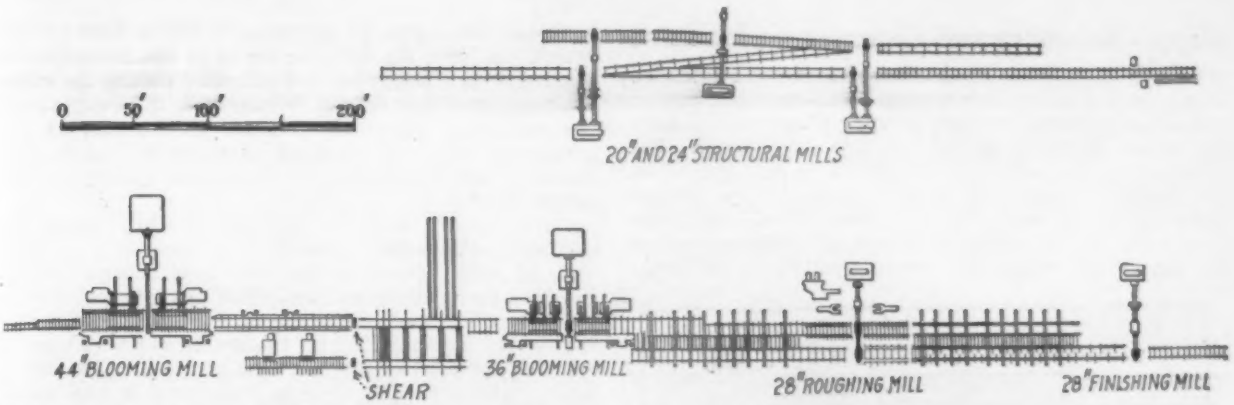
The light structural mill roll stands are similar in design to the 28-in. mills. The first stand is equipped with tilting tables fitted with patent stake manipulators. The mill is designed to roll light structural sec-



In the View Above, the Cradle and Slide, by Means of Which the Lower Roll Is Removed from the Stand, Are Prominent. This permits the use of rolls with large collars, rolling blanks for structural steel



At the Right Is One of the Three-High 28-In. Mills



It Is Expected That the 44-In. Blooming Mill, at Lower Left, Will Supply, Not Only All the Blooms for the 36-In. Mill in Center and the 28-In. Mills at Right, But Also a Portion of the Steel for the 24-In. and 20-In. Structural Mills at Top of Cut. Some of the steel for the structural mill will come from an older blooming mill

tions, also mine rails. On account of the large tonnage such a mill will produce, it has a double finishing end. Space was allowed so that the hot bed could be increased in length. The roller straighteners are equipped with extra housings, so that they can be changed from one section to another as quickly as the roll stands. The blooms for the light structural mill will be partly supplied by the 44-in. blooming mill and partly by an existing blooming mill, not shown on the layout. The runout tables are equipped with both cold saws and shears.

France to-day controls approximately 35 per cent of the iron ore reserves of Europe, or twice as much as the British Isles and three times as much as Sweden or the German Republic. With the introduction of American practice into its rolling mills, France should soon take the lead in Europe in the production of steel. The next twenty years may witness a wonderful growth and development of the industries of France.

American Rolling Mill Co. Offers to Buy Ashland Iron & Mining Co.

The American Rolling Mill Co., Middletown, Ohio, has made a definite proposition for the purchase of the assets of the Ashland Iron & Mining Co., Ashland, Ky. The details of the offer have not been made public. The offer to purchase the Ashland company's plant is being made with a view to strengthening the position of the American Rolling Mill Co. in the steel industry. Should the deal go through, the American Rolling Mill Co. will acquire two blast furnaces with a capacity of 100,00 tons of pig iron yearly; a practically new open-hearth department, consisting of six 100-ton furnaces; a very modern blooming mill and six sheet mills. The deal also includes the railroad property of the company and the coal holdings. A meeting of the stockholders of the Ashland Iron & Mining Co. has been called for Dec. 21 at Ashland to hear and discuss the proposition made by the Middletown company.

Navy Awards Bar and Shape Tonnages

WASHINGTON, Dec. 13.—The Bureau of Supplies and Accounts, Navy Department, has awarded steel bar and shape tonnages in connection with the opening of bids on Nov. 1. It has not as yet made awards on plate and sheet tonnages. The material is for navy yard stocks. Of the 1000 tons of steel bars called for, 450 tons went to the Cambria Steel Co., at 1.60c., base Pittsburgh, while miscellaneous lots went to the Camden Forge Co., the Empire Galvanizing Co., the Erie Forge Co., and the Pacific Coast Steel Co. Of the 1300 tons of shapes included in the schedule, 900 tons went to the Cambria Steel Co., also at 1.60c., base Pittsburgh, and other lots went to the Pacific Coast Steel Co., the Bethlehem Steel Co., and the Empire Galvanizing Co.

The bureau cancelled a portion of the steel bar and shape tonnages, having transferred material of this kind from yards where it was not needed to those where it is required.

The Bureau of Yards and Docks of the Navy Department opened bids on Wednesday of last week for a warehouse to be built in Hawaii, involving 600 tons of shapes and a small quantity of reinforced concrete bars. The lowest bid for the general contract was submitted by W. F. Martens, Rochester, N. Y., at $249,964, who has promised completion of contract in 280 days from the date of the award.

Will Prepare Plant to Make Larger Guns

WASHINGTON, Dec. 13.—The naval ordnance plant at South Charleston, W. Va., will be prepared during the present fiscal year for the manufacture of guns of the larger size, according to the report of Rear Admiral C. W. Park, Civil Engineers Corps, Chief of the Bureau of Yards and Docks, Navy Department.

During the fiscal year ended June 30, Rear Admiral C. B. McVay, Chief of the Bureau of Ordnance, reports that practically all of the cancelled wartime contracts were financially closed. A few contractors, however, did not accept what the bureau considered just and reasonable settlements and have brought suit in the Court of Claims.

A total of $101,247,784.26 has been returned to the Treasury Department out of war-time appropriations, in addition to the $195,833,843.69 which was returned by the act of Feb. 25, 1919.

New contracts, amounting to $8,204,253.20, were awarded during the year for technical ordnance material, such as guns, gun forgings, projectiles, fire-control equipment, etc. This does not include contracts for commerical material procured through the Bureau of Supplies and Accounts.

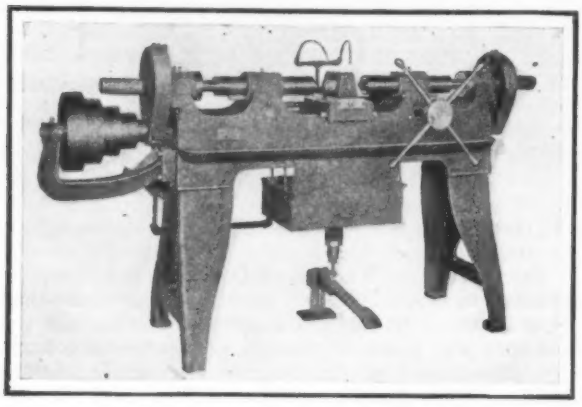
Will Establish Yale & Towne Plant in Germany

The Yale & Towne Mfg. Co., Stamford, Conn., hoists, locks, etc., announces it will establish in Germany a branch plant. This company does a large export business, particularly in South American countries. By establishing a plant in Germany it will avail itself of the low production costs in that country, thereby placing itself in a position to compete more successfully for export business. Where the German plant will be located and when production will start, has not been made public. Peter F. Augerbraun, superintendent of design and production Stamford, will be manager of the proposed German plant.

W. A. Baldwin, regional manager of the Erie Railroad at Youngstown, Ohio, announces that car repair shops of the Erie at Meadville, Pa., Cleveland and Galion, Ohio, will be closed the middle of December and will not reopen until after the first of the year. The suspension is necessary, states Mr. Baldwin, in order to curtail expenses in this period of light freight traffic, which is declared to be 33 per cent lighter than normal. He reports that the Erie shops have not operated full time since November, 1920.

Nipple Reaming and Chamfering Machine

A nipple reaming and chamfering machine intended to produce a better nipple at a lower cost than by the present established method, is being placed on the market by the Murchey Machine & Tool Co., Detroit. The reaming and chamfering is handled as one operation, the thread cutting being a separate operation. Where reaming is done on a threading machine at one operation with the threading, it causes an undue strain on the dies, it is claimed, this strain resulting in relatively



The Chuck Is Opened by the Foot Lever

higher manufacturing costs, due to the necessity of constantly repairing and replacing dies and die parts.

The machine shown in the illustration is equipped for reaming and chamfering, the capacity being ½ to 2-in. pipe in lengths, close nipple, to 12 in. The pipe is held in the chuck which is opened by the foot lever and which automatically closes when the foot is raised and the lever released. After the nipple is reamed and chamfered it is knocked out by the operator putting in a new pipe, and drops into the receptacle provided. The chuck has hardened and ground jaws, slides on wide bearings, and centers itself as the dies start cutting. The machine is ruggedly constructed and has ample bearings on all moving parts. The countershaft is arranged with right and left hand pulleys and cone pulley, resulting in four different speeds. An oil pump is provided.

The output is said to be 650 ¾-in. or 350 1½-in. nipples per hour reamed and chamfered. The weight is given as approximately 1200 lb. and the floor space required, 8 by 2 ft.

While primarily designed for reaming and chamfering purposes, for plants whose production is not great enough to make advisable a separation of the operations, the machine can be equipped with dies for threading nipples or pipe from ⅛ to ¾ in. in diameter. It will also thread tees, valves, studs and other parts requiring threading on both ends.

New Form of Planer Motor Drive

With the intention of solving the problem of preventing planers from overtravel, either on reversal, or on failure of voltages, or from other causes, the General Electric Co., Schenectady, N. Y., has developed a new form of control for the direct connected motor drive, which employs dynamic braking for stopping.

The apparatus consists of a control panel on which are mounted the necessary rheostats, contactors, etc., a resistance; a master switch or push button, and a standard direct current reversing adjustable speed motor. The control falls into two groups, one with a resistance selecting contactor, the other without it. The rest of the equipment, consisting of forward, reverse and accelerating contactors, is the same in both cases.

The selective resistance contactor controls the value of the dynamic brake resistance in each direction of rotation, so that the resistor can be adjusted for one direction without affecting the adjustment in the other. A machine equipped with this control that is geared to give 25 to 50 ft. per min. on the cut stroke, and 50 to 100 ft. per min. on the return stroke with motor speeds of 250 to 500 r.p.m. on the cut and 500 to 1000 on the return can have the dynamic brake on the cut adjusted to give a maximum stopping effort of 500 r.p.m. without regard to the return. Otherwise, it is explained, the resistance being adjusted for 1000 r.p.m. or the maximum speed, the braking effort at 500 r.p.m. will not be great enough to stop the planer quickly on the return stroke.

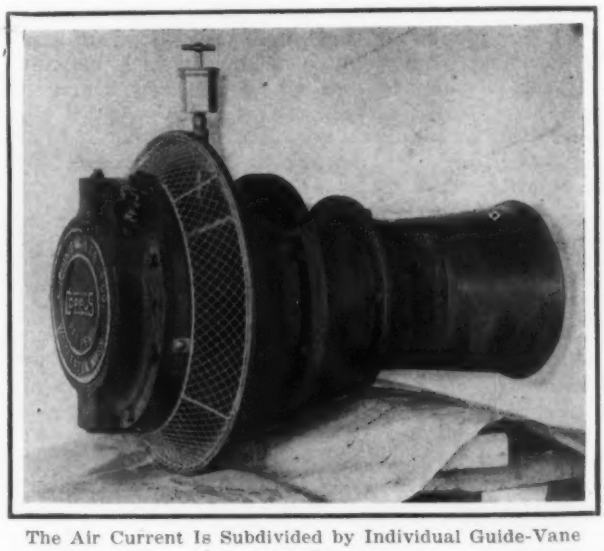
On a machine in actual operation the full load of the cutting tool is added to the braking load of the motor, and, if both are equal the overtravel beyond the set limits of the machine will be half of the overtravel with no load on the tool. With the resistance selecting contactor, the braking load on the motor at 500 r.p.m. is made approximately 200 per cent of full load, which is said to affect the difference in overtravel in two ways. First, the brake resistor being adjusted at 200 per cent instead of approximately 100 per cent of full load, reduces overtravel 50 per cent. Second, the effect of full load on the tool reduces the overtravel 33 per cent the motor braking effort being twice that on the tool load. Thus the difference in overtravel between no load and full load becomes approximately 33 per cent of the difference when no selecting contactor is used.

The features claimed for the new type of drive are dependability, ease, certainty and adaptability of operation, and time efficiency. Difficulties due to the welding of contactor tips are said to be effectively and simply avoided. The utilization of dynamic braking with the further refinement of the selective resistance is said further to permit of many operations which are difficult, if not impossible with other types of control. It is said to be possible to jog the planer effectively by means either of the master switch or with a push-button station.

New Screw-Blade Propeller Blower

A screw-blade propeller type blower, known as the Vano, which operates against pressure up to 8 in. water, has been placed on the market by the Coppus Engineering & Equipment Co., Worcester. In addition to high running efficiency it is claimed that the power consumption at constant speed is practically unaffected by variations in air delivery or pressure.

The blower is shown in the accompanying illustration. The air current leaving the propeller is sub-



The Air Current Is Subdivided by Individual Guide-Vane Blades

divided by individual guide-vane blades and is taken up by them without shock. These blades have a curvature that increases in the direction of the propeller rotation, which concentrate the air current and give it a further acceleration inside the stationary guide vane so that a considerable part of the pressure is produced in the latter. A large part of the end thrust is thus taken up by the stationary guide-vane casing. The air streams into which the flow of air has been subdivided leave the guide-vane casing slightly rotating, and converge toward the axis, so that the smallest section of the air flow is beyond the guide-vane casing.

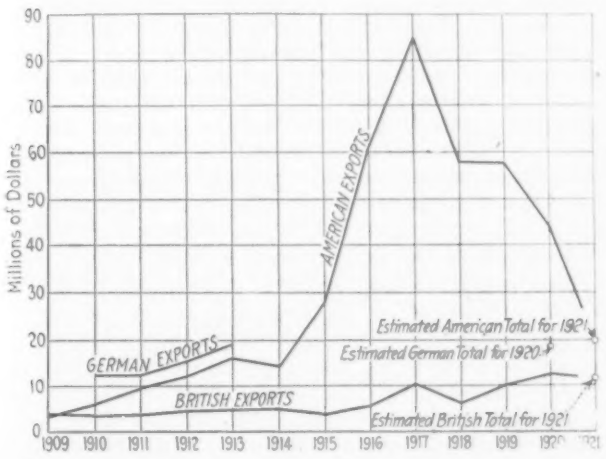
Trend of British Machine Tool Exports

Not Keeping Pace with American Machine Tools, in Spite of Being Cheaper—German Pre-War Predominance More Apparent Than Real

BY W. H. RASTALL*

RETURNS of British exports and imports of machine tools that have just become available provide interesting information as to the comparative position of American and British tools in the world's markets. Recent years have witnessed some abnormal conditions in the foreign demand for machine tools, and one has considerable uncertainty on attempting to feel the way back to "normalcy," as there seems to be no such thing. One of the charts represents the position in the world's trade of the three most important producing countries, during the past twelve years.

The first interesting detail revealed, and also possibly the most important, is the situation shown by the record before the war. Up through 1913 the American position was rapidly improving, while it will be



British, German and American Exports of Machine Tools

noted that British trade made very little progress; the actual British figures being about $3,700,000 in 1909 and $4,900,000 in 1913, as compared with American exports of some $3,600,000 in 1909 and $16,000,000 in 1913.

Such returns testify most eloquently to the splendid engineering represented in the American designs, and the actual recognition of this superiority in the markets of the world. Plainly, American manufacturers and exporters have little to fear from foreign "competition"; and it is recognized that in the world's markets for these tools there is little real competition, because the differences in design, in materials and in workmanship frequently place the American product in a class by itself, far above all foreign tools.

Now, the line representing German experience is deceptive, because the classification employed by the German customs authorities includes all metal-making equipment and machinery, much of which is not included in the British and American returns, and the large bulk of the German totals suggests that they enjoyed a very large trade, which is not the case. Their best market during these pre-war years, outside of Europe, was South America, and their influence in that market was comparatively strong.

Yet, according to a survey made by one of our American publishing companies, British manufacturers had supplied about 42 per cent of the tools, American manufacturers 39 per cent and German manufacturers 12 per cent, which represents more accurately the estimate one forms of the comparative trade of the several nationalities after traveling through overseas markets. Because of this difference in classification, it is important to note not the values represented by these lines, but the slope. German trade increased from about $12,400,000 in 1910 to $19,500,000 in 1913, a gain of 57 per cent, while the American gain was 166 per cent during the same period. Obviously, American interests have every reason to be perfectly satisfied with this pre-war record.

Confusion resulting from the declaration of war in 1914 caused a temporary setback in American exports, and the German business was completely destroyed, not to revive until after the armistice, late in 1918. The record of the war years requires no comment. British manufacturers were wholly occupied with war duties, and American manufacturers could sell all that they could ship, and this condition continued for some time after hostilities ceased.

Our present problem is introduced by the remainder of the chart. British tools usually differ greatly from the American types, and the world's markets for such equipment have been inadequately supplied for some years. Also, the increase in cost per tool would cause the line to rise, in spite of the fact that the values have been corrected for fluctuation in exchange and are expressed in dollars, not pounds sterling. But at any rate the American line is falling rapidly, the British is rising, while the German return for 1920 is approximately the same as for 1913, at about $19,000,000. The probability is that the American total for 1921 will approximate $20,000,000.

In the second diagram we have further details as a monthly record of more recent British experience,

British Foreign Trade in Machine Tools

taken from data published by *Machinery* (London) and forwarded by Candler Cobb, American Trade Commissioner there. This data cannot be checked with that for the first diagram, as it does not cover a complete calendar year, and the data are from a different source. However, it will be noted that, contrary to the suggestion of the first diagram, British total exports are decreasing rapidly, and for all of 1921 will approximate less than £3,000,000, or (say) $12,000,000.

This trend in the line on the diagram suggests that, although one would expect that the demands for British style tools had not been adequately supplied for years, and the corresponding market for American style tools had been over-supplied, the influence of the latter is still powerful enough to prevent the development of the market for the former, viz., the simpler and less expensive types of equipment—a circumstance

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TABLE I

British Machine Tool Exports

	Drilling		Grinding		Lathes		Milling		Planing and Shaping		Presses, Punching, Shearing		Other Descriptions		
1920	No.	£	No.	£	No.	£	No.	£	No.	£	No.	£	No.	£	Total £
Aug.	296	39,700	68	8,864	607	150,651	58	22,893	103	44,526	33	17,776	269	59,290	343,700
Sept.	310	40,721	75	5,871	489	131,132	86	32,031	78	21,475	36	17,403	215	59,696	308,329
Oct.	309	58,383	90	8,990	472	98,509	63	17,458	78	36,313	57	15,055	205	73,271	307,979
Nov.	395	68,140	103	15,091	615	160,291	91	24,625	79	45,302	113	28,800	305	73,838	416,087
Dec.	338	68,565	173	16,466	596	152,043	118	25,845	111	50,729	65	17,417	251	86,018	417,083
1921															
Jan.	355	59,221	101	20,547	431	120,036	59	23,940	136	54,981	53	17,761	334	98,293	394,779
Feb.	234	46,549	76	16,769	255	116,405	55	17,612	46	21,492	75	20,740	197	60,725	300,291
March	159	48,422	101	15,147	368	111,748	125	21,805	81	36,815	99	39,591	255	64,311	337,839
April	147	50,543	47	17,239	243	109,336	26	18,987	64	53,710	50	21,032	256	60,686	331,533
May	174	25,444	29	6,837	138	56,268	83	17,161	66	26,948	28	26,522	216	76,535	235,715
June	76	24,168	41	10,556	246	96,958	88	31,249	27	18,055	24	10,472	146	68,421	259,879
July	170	20,422	44	6,488	236	95,440	60	15,440	23	21,052	34	18,824	129	59,883	237,549
Aug.	87	29,824	73	11,841	192	54,043	8	3,122	32	12,260	45	21,510	117	49,098	181,698
Total	3,050	580,102	1,021	160,705	4,888	1,452,860	920	272,168	924	443,658	712	272,903	2,895	890,065	4,072,461

that encourages more aggressive selling on the part of Americans.

In considering the comparative position of American and British machine tools in the markets of the world, it should be remembered that, for many years, America has shipped great quantities of these tools to the United Kingdom, while the trade in the opposite direction has not exceeded $100,000 in any one year—a condition that is not to be attributed entirely to the workings of the tariff.

But, following the armistice, there has been a strong tendency for the British imports of American made tools to recede from the very high levels of war days. In August, 1920, British imports still exceeded their exports, but as the diagram shows, there has been a rapid decrease in the volume of this business, and it has reached low levels, which fact in itself has a most important influence on the American returns; for even as late as 1920 the United Kingdom absorbed 25 per cent of the total American exports of metal working machinery.

The diagram also shows the monthly record of British lathe exports. Further details of this sort for other types of machine tools are given in Table I, from which it will be noted that the trade in standard tools, such as lathes, drills, milling machines, planes, shapers, etc., is rapidly decreasing, while special types, like grinders, punches, and the unclassified types are still in good demand. Corresponding data with regard to British imports are shown in Table II.

Boston Chapter, A. S. M. E. Meets

The Boston section, American Society of Mechanical Engineers, on Wednesday afternoon, Dec. 14, inspected and studied the Lynn, Mass., plant of the General Electric Co. The members attending were made up into four parties for the inspection by groups of the motor, turbine, street lighting and meters and instrument departments. Late in the afternoon, moving pictures of various manufacturing operations were shown, following which dinner was served. In the evening there was a joint meeting with the Lynn section, American Institute of Electrical Engineers at which W. E. Hoke, Baltimore, formerly with Pratt & Whitney Co., Hartford, Conn., delivered a paper on "Precision in Machine Tool Work; Its History and Modern Developments."

Sheet Metal Products Association Meets in Chicago

The Sheet Metal Products Association held its eleventh annual convention at the Congress Hotel, Chicago, Dec. 8 and 9. The meeting was attended by 45 sheet metal products manufacturers and mill representatives. Considerable attention was given in the discussion to cost accounting and sales problems. The matter of gaining wider recognition for the association label and greater publicity for the products manufactured by the members brought out a general expression of opinion and resulted in the adoption of a resolution urging the rolling mills to give serious consideration to the launching of a general advertising campaign to promote the demand for sheets and sheet products. The secretary was directed to send copies of the resolution to all mills.

Officers elected for the coming year include: President, F. L. Nelson, O. K. Harry Steel Works, St. Louis; treasurer, A. N. Eaton, Nebraska & Iowa Steel Tank Co., Omaha, Neb.; vice-presidents, F. L. Canine, Crawfordsville (Ind.) Wire & Nail Co., William A. Knapp, Butler Mfg. Co., Kansas City, and M. B. Armstrong, Thomas & Armstrong Co., London, Ohio. The association membership is made up of manufacturers of sheet metal farm and highway equipment, such as grain bins, corn cribs, watering tanks, culverts and wagon tanks.

Five hundred tons of steel for the Riley Creek bridge, the last gap in the Government's standard gage railway from Seward to Nenana, Alaska, has reached Seattle recently from the Atlantic seaboard on the steamship Harry Luckenbach. The steel was immediately transshipped on the Admiral liner LaTouche for delivery to Anchorage, Alaska. The new Riley Creek bridge will be completed in January, when the Government will have a standard line of 411 miles. A gap at the Tanaka River will later be spanned by a 700-ft. steel bridge.

TABLE II

British Machine Tool Imports

	Drilling		Grinding		Lathes		Milling		Planing and Shaping		Presses, Punching, Shearing		Other Descriptions		
1920	No.	£	No.	£	No.	£	No.	£	No.	£	No.	£	No.	£	Total £
Aug.	313	82,824	121	32,450	215	40,809	176	52,517	96	28,482	1,095	18,228	428	107,444	362,754
Sept.	443	32,744	115	28,332	214	35,735	98	22,634	56	24,640	83	12,568	350	62,393	219,046
Oct.	145	64,200	131	16,626	145	22,097	117	32,445	72	12,120	161	37,919	454	42,003	227,410
Nov.	216	54,062	122	10,614	95	12,386	83	24,832	43	12,989	132	45,456	198	35,854	196,193
Dec.	148	32,671	44	8,624	123	19,917	27	5,841	63	17,764	92	46,748	212	40,371	171,936
1921															
Jan.	126	20,990	79	16,715	127	17,628	27	13,242	25	4,891	72	49,406	171	65,843	188,715
Feb.	123	6,496	2	2,460	111	14,751	37	14,640	48	3,599	58	26,300	312	47,510	115,756
March	188	4,482	9	665	137	14,787	6	237	14	1,994	36	14,092	128	24,959	61,216
April	189	4,636	91	2,184	145	6,318	7	2,990	45	3,454	40	12,141	65	19,490	51,213
May	10	1,270	21	6,296	16	3,552	9	2,633	17	550	36	11,763	170	11,613	37,677
June	152	3,395	9	1,205	35	4,326	5	345	12	2,169	78	17,643	35	10,166	39,249
July	61	1,691	26	4,533	37	1,500	11	3,811	6	1,715	4	4,275	23	3,257	20,782
Aug.	46	869	35	960	55	1,675	3	172	13	2,343	17	1,415	56	9,214	16,648
Total	2,160	310,330	805	131,664	1,455	195,481	606	176,339	510	116,710	1,904	297,954	2,602	480,117	1,708,595

Calculating a Foundry Iron Value

Unit Valuation of Elements in Foundry Pig Irons —Silicon, Manganese and Phosphorus Considered as Metalloids—Carbon and Sulphur Grouped with Fe

BY Y. A. DYER

FOUNDRYMEN who have been accustomed to thinking and speaking in terms of the simple ratio of "silicon to iron," in purchasing metal for the ordinary run of foundry work, will at some time face the problem of producing castings which must comply with rigid specifications—chemical and physical. Measured by these standards, the elements silicon and iron will not suffice—it becomes imperative to co-ordinate all alloyed elements in a mixture, by lowering or raising them, to balance the rigid chemical and physical specifications demanded of a high duty and complicated casting.

The cupola mixing process then hinges on whether the metals to be used contain the desired inherent elements in balanced form; whether deficient elements have to be chemically incorporated as ferroalloys, or whether excess elements have to be lowered by the use of selected or special metals. Then it is that the matter of unit valuation of elements, present and absent, becomes a real factor to the foundryman, rather than a mere academic question.

Commercial pig iron is a conglomerate mass of iron, carbon, silicon, sulphur, phosphorus and manganese, in varying proportions. Each of the metallic and metalloidal elements alloyed with cast iron performs its conjunctive function in determining ultimate results, therefore (with the possible exception of sulphur) a fairly approximate unit value may be placed on each one. Carbon is the distinguishing and controlling factor in cast iron; that is: its presence or absence in substantial amounts determines whether the metal is cast iron, steel or wrought iron. Hence its unit value, together with sulphur, may be included with the iron unit value, and the total weight of the three elements computed by difference, after having determined the weights of silicon, manganese and phosphorus.

Silicon, manganese and phosphorus may be considered the alloyed elements of basal value; and if the accepted base metal for a mixture does not contain sufficient silicon and manganese to impart the requisite amounts of each element to the resultant casting, ferroalloys are used. If phosphorus is needed, and the iron does not contain a sufficient amount of this element, ferrophosphorus is used; or if an iron contains too much phosphorus for specific work, a certain percentage of low phosphorus metal is used to produce a low average of that element in the mixture. Therefore, the elemental manipulations sometimes become complicated; and to obtain satisfactory results in balancing a metal mixture, with desirable inherent constituent elements, requires skill and expense.

Advantage of Using Irons Rather Than Alloys

But as such a natural mixture will admit of a more uniform distribution of the elements throughout the metal mass, compared with a mixture "boosted" by ferroalloys, the intrinsic value is in favor of using as a base metal an iron which carries well balanced elements. The loss by oxidation of manganese, when used in ferromanganese form, is 20 to 25 per cent greater than the manganese loss when a manganous pig iron (1.25 to 2.50 per cent manganese) is used. The oxidation loss of silicon is greater when ferrosilicon is used than when a normally high silicon pig iron is used.

Therefore, in addition to the regular value factors given below for ferroalloys, there is a recognized inherent premium unit value attached to the element iron which is so balanced in silicon, manganese and phosphorus contents that it may be used as a base metal, to the exclusion of ferroalloys, in the manufacture of high-grade castings. This premium value to a melter may be safely placed at 10 per cent over the price of standard iron unit value—or (0.0092 x 0.10)=0.00092c. per lb., based on a $22.50 market price. Therefore, the factor 0.00092 will be used as the premium iron unit value for "special iron." Using the base price of $22.50 per ton, f.o.b. cars at furnace, for standard No. 2 Southern iron, the iron unit value will be found to be ($17.76÷1930)=0.0092c. per lb.; and for "special iron" (0.0092+0.00092)=0.0101c. per lb. Therefore, these factors will be used for iron unit values, including carbon and sulphur.

Calculation of Metalloid Factors

The factors for silicon, manganese and phosphorus values are computed as follows: Electrolytic ferrosilicon (50 per cent silicon), selling at $72 per ton, shipping point, is equivalent to $63 for contained silicon, or ($63÷1000)=0.063c. per lb. for contained silicon, therefore the factor 0.063 will be used for the silicon unit value. It requires about six and one-half times the amount of high silicon iron (12 per cent silicon) to supply the same amount of silicon to a mixture as will obtain by the use of 50 per cent ferrosilicon, hence it is more economical to use this grade of ferroalloy in foundry mixtures.

Ferromanganese (80 per cent manganese), selling at $100 per ton, c.i.f. seaboard, is equivalent to ($100÷1600)=0.0625c. per lb. for contained manganese, therefore the factor 0.0625 will be used for the manganese unit value. It requires more than five times the amount of high manganese iron (12 to 15 per cent manganese) or four times as much spiegeleisen (20 per cent manganese) to supply the same amount of manganese to a mixture, as will be obtained from the use of ferromanganese. Hence it is more economical to use this high grade of ferroalloy in foundry mixtures.

Ferrophosphorus (20 per cent phosphorus) iron selling at $47 per ton, shipping point, is equivalent to $32.25 for contained phosphorus, or ($32.25÷400)=0.08c. per lb. of contained phosphorus, therefore the factor 0.08 will be used for the useful phosphorus unit value. The element phosphorus, however, may be stated as having a dual valuation. That is: its presence has a value for certain work, and its absence creates a value for certain other work, therefore a valuation "down" may be given this element.

With standard Southern iron (approximately 1 per cent phosphorus) selling at $22.50 per ton at the furnace, and low phosphorus iron (0.03 to 0.04 per cent phosphorus) selling at $26 per ton at the furnace, there is created a premium of $3.50 per ton for decrease in phosphorus. Comparing the phosphorus present in the two irons, there is a decrease of (20—0.60)=19.40 lb. per ton of metal, or ($3.50 ÷ 19.4) = 0.18c. per lb. for decreased phosphorus; therefore the factor 0.18 will be used for the "down" phosphorus unit value, in addition to the small amount of useful phosphorus present and needed.

Following factors, summarized from data given above, will be used in valuing elements in standard pig irons:

0.0630c. per lb. for silicon.
0.0800c. per lb. for phosphorus.
0.0625c. per lb. for manganese.
0.0092c. per lb. for iron, carbon and sulphur.

Following factors, summarized from data given

above, will be used in valuing elements in special pig irons:

0.0630c. per lb. for silicon,
0.0800c. per lb. for useful phosphorus,
0.1800c. per lb. for decreased phosphorus below 1 per cent,
0.0625c. per lb. for manganese,
(0.0092 + 0.00092) = 0.0101c. per lb. for iron, carbon, sulphur, etc.

Of course, these factors will vary with change in prices of ferroalloys, and low phosphorus, or "acid Bessemer" iron, but the principle of valuation will remain the same, and the foundryman will be enabled to figure at all times whether it will be more economical to use ferroalloys or to purchase a "premium iron" which will supply the desired elements and eliminate the undesirable elements, or keep them within casting specifications. The principles involved in the calculations are as follows, the price of iron being $22.50 per ton f.o.b. furnace for standard Southern iron:

Assumed average analysis:

	Per Cent	Lb. per Ton	
Si	2.00	=	40
P	1.00 max.	=	20
Mn	0.50 min.	=	10
S	0.05 max.	1	
C	3.75	75	
Fe	92.70	1854	= 1930
			2000

Valuation of elements:

Si	=	40 × 0.0630 =	$2.52
P	=	20 × 0.0800 =	1.60
Mn	=	10 × 0.0625 =	0.62
Fe + C + S	=	1930 × 0.0092 =	17.76
			$22.50 f.o.b. furnace

The principle involved in the calculation of the unit values of special analysis iron is as follows:

Assumed average analysis:

	Per Cent	Lb. per Ton	
Si	2.00	=	40
P	0.40	=	8
Mn	1.25	=	25
S	0.05 max.	1	
C	3.75	75	
Fe	92.55	1851	= 1927
			2000

Valuation of elements:

Si	=	40 × 0.0630 =	$2.52
P	=	8 × 0.0800 =	0.64
P (20—8)	=	12 × 0.1800 =	2.16
Mn	=	25 × 0.0625 =	1.56
Fe + C + S	=	1927 × 0.0101 =	19.46
			$26.34 f.o.b. furnace

With each advance of 0.50 unit of silicon, 10 lb. of silicon will be added to the ton of metal, and a lowering of 10 lb. of iron, for which the foundryman pays (10x 0.063)=0.63c. per ton for increased silicon and has deducted (10x0.0092)=0.092c. per ton for iron, or about an average of 0.53c. net advance per ton of pig iron for each 0.50 point advance in silicon, as follows:

	Silicon Range	Aver. Si	Value Si	Value P+Mn	Value Fe+ C+S	Total
	1.25 to 1.74	1.50	$1.89	$2.22	$17.85	$21.96
	1.75 to 2.24	2.00	2.52	2.22	17.76	22.50
Standard	2.25 to 2.74	2.50	3.15	2.22	17.66	23.03
S 0.05 max.	2.75 to 3.24	3.00	3.78	2.22	17.57	23.57
P 1.00 max.	3.25 to 3.74	3.50	4.41	2.22	17.48	24.11
Mn 0.50 min.	3.75 to 4.00	4.00	5.04	2.22	17.39	24.65
	1.25 to 1.74	1.50	$1.89	$4.35	$19.57	$25.81
	1.75 to 2.24	2.00	2.52	4.35	19.47	26.33
Special	2.25 to 2.74	2.50	3.15	4.35	19.36	26.86
S 0.05 max.	2.75 to 3.24	3.00	3.78	4.35	19.26	27.39
P 0.40	3.25 to 3.74	3.50	4.41	4.35	19.16	27.92
Mn 1.25	3.75 to 4.00	4.00	5.04	4.35	19.06	28.45

The principle involved in calculating the cost of a ferroalloy mixture as compared with straight pig iron used as a base metal is given below. The following alloy mixture was used by certain shell manufacturers during the war. Metal prices per pound f.o.b. shipping point are based on April, 1921, market prices:

Mix	Si	P	Mn	Per Cent	Lb.	Lb. Price		Ton Price
Pig iron ...	2.00	0.60	0.70	32.00	640	× 0.0126	=	$8.06
Steel	0.10	0.04	0.75	30.00	600	× 0.0070	=	4.20
Scrap fdy...	1.30	0.30	0.75	37.00	740	× 0.0060	=	4.40
Ferrosilicon	50.00	...	...	0.70	14	× 0.0630	=	0.88
Ferromangan.	...	...	80.00	0.30	6	× 0.0625	=	0.37
				100.00	2000	× 0.08955	=	$17.91
Cast. analysis	1.263	0.311	0.749					

The following pig mixture would answer the same purposes:

Mix	Si	P	Mn	Per Cent	Lb.	Lb. Price		Ton Price
Pig iron	2.75	0.60	1.25	30	600	× 0.0135	=	$8.10
Steel	0.10	0.04	0.75	30	600	× 0.0070	=	4.20
Scrap fdy...	1.30	0.30	0.75	40	800	× 0.0060	=	4.80
				100	2000	× 0.08605	=	$17.10
Cast. analysis	1.256	0.0312	0.739					

In addition to saving $0.81 per ton by using the latter mixture, a more uniform casting may be expected, by reason of a more equal distribution of the elements silicon and manganese, which are inherent constituents of the metals used in the mixture.

Boston Chapter, Society for Steel Treating, Holds Laboratory Meeting

Through the courtesy of the Massachusetts Institute of Technology, the Boston chapter, American Society for Steel Treating, held its initial laboratory meeting at the institute on the evening of Dec. 9. A large number attended. Irving H. Cowdrey, chairman, presided and introduced Harrison W. Hayward, professor of materials of engineering at the institute. For the benefit of those not familiar with a testing materials laboratory, Professor Hayward explained first its functions—routine, research, testing of structural steel, and just what constituted each kind of work under these headings. This was followed by an explanation of the relation of the laboratory to industry, a lesson in the proper use of terms used in connection with laboratory work, and finally, useful information regarding the preparation of specimens to be presented for laboratory testing.

Following Professor Hayward's remarks, the members visited various laboratory divisions of the institute, and with the aid of laboratory result sheets, witnessed tests made on a large number of specimens furnished by various steel companies. For the institute, A. C. Fales and I. N. Zavarine conducted tests in the heat treating laboratory; Victor Homerberg in the metallographic laboratory; R. G. Adams in the autographic testing, hardness and shock testing laboratory; and C. A. Chayne and E. M. Brickett in the commercial testing laboratory. In the shock tests, Mr. Adams was assisted by Mr. Cowdrey. An open discussion followed the testing, many questions being asked and answered by Mr. Cowdrey, and those in charge of the testing machines. Members attending agreed the meeting was the most interesting held by the Boston chapter and an effort will be made to hold another meeting at the institute.

Drill Prices Reduced

Another price reduction has been made on high speed and carbon steel twist drills, effective Dec. 7. The reduction ranging from 10 to 30 per cent on various items. New prices to large consumers are 65 per cent off list for carbon drills and 30 to 40 per cent off list, depending on sizes, for high speed drills. Drill manufacturers report that the large stocks of drills that consumers have carried during the present year show signs of being used up and that the demand recently has shown a little improvement.

Secretary of Commerce Hoover will open a conference of constructors, architects and engineers in the assembly room of the Department of Commerce Thursday morning, Dec. 15, to consider the adoption of standard contract forms for all classes of construction work. The meeting has been called to consider the suggestion of the Hoover report on the elimination of waste in the building industry, that present contract forms need revision.

The J. L. Collins Machine Co., doing a general foundry and machine shop business in Haverhill, has incorporated under Massachusetts laws with a capital of $25,000. Jay L. Collins, 49 Webster Street, that city, is president, and Herman C. Leschke, 7 Lincoln Street, Bradford, treasurer.

CONTENTS

ESTABLISHED 1855

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Reworking Steel

Scrap is likely to play a more important part in the manufacture of steel in the next few years than ever before. Except for material that is destroyed or dissipated there is a return for reworking at one time or another. An attractive concept has been that there is an average period. This is not precise, but it is a convenient assumption for purposes of discussion. Roughly speaking, the quantity of scrap that comes out at any time is determined by the period in which the material has been in employment, and by the rate of production of steel at the time it was put into employment.

For a long time the production and consumption or employment of steel increased very rapidly, in a geometrical progression. The current outcome of scrap was in proportion to the production at some earlier time, when the tonnage was much less. Now the production of steel is increasing less rapidly. The record year for output was 1917, and as 1922 is unlikely to show as large an output one may speak of there being five years without a new production record being made.

Sometimes it is assumed that scrap comes back in 15 years, on an average. That is probably too short a period, but it will do for illustration. In any of the next few years the steel production of 15 years earlier will be a larger percentage of the production in those years than used to be the case. In 1906, for instance, the production of steel ingots and castings was six times the production in 1891, 15 years earlier, while the production of pig iron more than tripled in those 15 years. Similar multiplications will not be shown comparing 1907 with 1922 or 1910 with .1925. Other things being equal, the proportion of scrap developing to new steel being made will increase over the proportions obtaining in recent years.

As to the factor of the length of return, industry has passed into a highly competitive period, where efficiency will be the watchword. Industry will not stand still, but will employ its resources of brains and capital in improving processes and lowering costs rather than in swelling output. Obviously that will mean ruthless scrapping of equipment if something better can be put into use. Incidentally there was much construction during the war of doubtful value thereafter, and the three years since the ending of hostilities have been years of such uncertainty that little could be settled as to what should be done with the equipment. Thus, on the whole, the indication is that for the next few years new material is going to become scrap sooner than was formerly the case, and that again will tend to increase the proportion of scrap to new steel made.

It may be asked why, if these are the trends, there is not more evidence now at hand to this effect. There have been two deterrent influences. There have been large quantities of iron ore at blast furnaces and on lower lake docks, which the owners desired to liquidate, and for more than a year there have been very high freight rates on scrap, higher in many cases than on pig iron. These high rates have caused scrap to be held back, while there are fair-sized accumulations of scrap in dealers' yards. Thus the development of the scrap situation is delayed.

About three-quarters of a billion tons of pig iron has been made in the United States up to date, and more than half of this total has been made in the past 15 years. Undoubtedly the major part of this iron is in employment or is capable of being taken up for use as scrap. Merely a small percentage of this total store, returned for re-working each year, will provide a very substantial tonnage of scrap.

If proof were needed that Germany is working hard, it would be afforded by her heavy buying of American copper. This has reached proportions never equaled. For the ten months ended with October, exports of refined copper to Germany have been 39.50 per cent of the total and more than the combined exports to France, Great Britain and Japan. Out of total exports of 468,215,221 lb., Germany has taken 184,739,354 lb., while 177,852,061 lb. went to the three other countries mentioned. If the American exports to Holland of nearly 21,000,000 lb. are in part for German consumption, then Germany's share of the total ex-

ceeds 40 per cent. In 1913 exports to Germany were larger than to-day, but the percentage then was only one-third of the total. The larger percentage now in spite of the smaller actual total is impressive through proving the high state of operations in the one country when business in the rest of the world is depressed. In 1913 every effort was being made in Germany to gather up stocks in preparation for war; to-day metal purchases are made in spite of the almost vanishing purchasing power of the mark.

The Number of Workers

In connection with the 1920 census a preliminary report has been issued on the number of persons gainfully employed, and thus material is furnished for a fresh appraisal of the disposition to work. Hitherto it has been necessary to depend upon the 1910 census and make estimates for changes that may have occurred since then. The census dates are April 15, 1910, and Jan. 1, 1920. The persons gainfully employed are not, of course, merely those who were actually engaged on the census dates but are those who were normally employed.

Comparing 1910 and 1920, total population of continental United States increased from 91,972,266 to 105,710,620, or 15 per cent; population ten years of age and older increased from 71,580,270 to 82,739,315, or a trifle more than 15 per cent, and the number gainfully employed increased from 38,167,336 to 41,609,192, or only 9 per cent.

It is necessary to revise the view often expressed of late, particularly in connection with estimates of "unemployment," that an abnormally large proportion of the population was in employment in 1920. The reverse was the case. Of those ten years old and older, 50.3 per cent were gainfully employed in 1920, against 53.3 per cent in 1910, 50.2 per cent in 1900, and smaller proportions in earlier years. The high proportion was in 1910. The census report suggests that part of the decrease in proportion from April 15, 1910, to Jan. 1, 1920, may be due to farm labor not being employed on the winter date, but as the commonly expressed view was that farm labor had gone to the cities this does not begin to explain the divergence. Another respect in which some views must be revised is that of female labor. Of females ten years of age and over, 21.1 per cent were gainfully employed in 1920, against 23.4 per cent in 1910, 18.8 per cent in 1900 and smaller proportions in earlier years. In other words, the report of a female invasion is true, but the matter has become ancient history. The trend from 1910 to 1920 was the other way.

The reduction in the proportion of persons gainfully employed from 1910 to 1920 is presumably attributable in very considerable part if not wholly to increased attendance at school in the years following the tenth, in grade school, high school and college. Such a change is highly satisfactory. It is quite improbable that the number of habitual loafers, without proper means of support, has increased, while neither our social system nor our disposition to spend money encourages men to retire from gainful employment with a small competence such as would be attainable by any considerable proportion of the population.

From the viewpoint of business, the matter is one which concerns our working strength. The number of workers has not increased in proportion to the population. What business men want to know in looking to the future is, at what rate can an industry or a line of employment be expected to grow? The decennial growth in population, in percentage, has been decreasing almost constantly. Prior to 1890 it was at various rates in excess of 20 per cent. From 1890 to 1900 and again from 1900 to 1910, it was 20 per cent, while from 1910 to 1920 it was 15 per cent. There has not been a geometrical progression, while from 1880 to 1920 there was practically only an arithmetical progression.

Anyone whose views as to the expansion of business were based upon the conception of the population's increasing by 20 per cent per decade must revise his basis, observing that in the last decade reported upon the number of workers increased only 9 per cent. If the nation prospers, the proportion of workers to population is unlikely to increase in the future. One cannot count upon an increase of as much as 1 per cent per annum in the number of workers, too small an amount to be given much weight in ordinary business calculations. The total amount of effort made by the nation, therefore, is now almost constant. For business and industrial expansion, reliance must be chiefly upon increase in efficiency, taking efficiency in the broadest sense, covering not merely personal efficiency but efficiency in appliances used. Beyond this, there may be extra growth in one line of activity at the expense of other activities. To illustrate, coal mining may be made more efficient whereby one miner will produce more tons of coal in a year and fewer miners may then be required. The time thus released may be spent in making electrical apparatus whereby the quantity of coal required to produce given results may be reduced.

Patent Office Distress

The lamentable conditions in the Patent Office and the importance of passing the legislation now pending in Congress are emphasized by the report of the Commissioner of Patents for the year ended June 30, 1921. It is shown that the patent office lost 163 examiners, scientifically trained and members of the bar, from July, 1919, to June 30, 1921. These men were replaced by inexperienced men, fresh from college, without any knowledge of patent law or legal training. In the same period, the number of applications for patents increased 34 per cent, while applications for trade-marks increased 85½ per cent. At the end of the fiscal year approximately 50,000 patent applications awaited action, as compared with 18,000 in July, 1919.

It appears also that a number of divisions are over 11 months behind in their work, and to illustrate the large turnover in the personnel, one of the

chemical divisions is cited where five out of nine of the examiners have been appointed in the last few months. At the close of the fiscal year, one of these had been in the office only one week, another three weeks, another seven weeks and another two months. One out of every four examiners has resigned in 16 months and more than one-half have resigned in 32 months.

The report points out that there are many industries which cannot enter into development work on account of the doubtful status of their applications for patents. The number of these unacted upon continues to increase and conditions have become steadily worse.

Any business concern having such a large turnover of employees and failing to such a large extent in meeting demands upon it would be considered a failure, and it is to the credit of the Patent Office that it has done as well as it has under adverse conditions. In a period of serious depression, when the business of the country needs all the help it can obtain, it is high time for Congress to take some action that will bring about a reasonable increase of Patent Office salaries and increase efficiency, so that pending applications can be disposed of with reasonable expedition.

Our Share in Exports

American exporters of steel are confronted with two important facts which recent developments have brought to the surface. One is the decision of the associated British steel makers to release mills from the export price agreement and the other is the rapid increase in British and German exports.

As to the former, while there has been for some time certain cutting of the prevailing fixed prices for export, the general release from this binding agreement will have a marked effect on competition for international business in that British prices are constantly declining and British sellers are eagerly anxious to recover their overseas business.

British steel exports are now considerably larger than the American and have been for each of the months of August, September and October. These were analyzed in THE IRON AGE Dec. 1. The British increase is likely to be larger rather than smaller in the succeeding months.

As to Germany, the latest data from *Stahl und Eisen* show that in August, Germany exported 240,035 tons of steel and pig iron, against only 75,827 tons for the United States and only 79,163 tons for Great Britain in the same month. While German mills are reported as oversold and in arrears on deliveries, that country's exports have maintained a consistent regularity since early in 1920 as contrasted with irregularity in both American and British. Germany's competition may undoubtedly be regarded as severe as it can be. The low cost of the mark will not keep orders from other nations on an expansion of world demand, for Germany cannot take care of the world. What applies to Germany applies broadly; business will come to the United States as well as to Great Britain when the world begins to buy. Much of the financing must be done by America and foreign buyers have less of the uncertain element of fluctuating exchange in dealing with this country. The improved mental state of the world augurs well for a gradual betterment in American exports.

The Life of Heavier Rails

That the weight of a steel rail is an important factor in the life of the rail, but in an entirely different ratio from what might be expected, has been established by the experience of one large Eastern railroad. In the last few years the New York Central Lines has gradually replaced its 80-lb. rails with 105-lb. rails. The evolution in the design of the rails used by this system is referred to elsewhere in this issue. A careful record of the life of the heavier rails has shown that the 105-lb. rail, with chemical composition little changed, lasts in the regular roadbed 2.7 times longer than the 85-lb. rail.

But the ratio of increased life is not the same above or below the weights cited. It has been found that the 130-lb. rail lasts only 40 per cent longer than a 100-lb. rail, while a rail of the 80-lb. class lasts only about twice as long as the 60-lb. rail.

In 1910, the country's rail production was 12.18 per cent of the total finished steel output; in 1913 it was 14.12 per cent. But in 1919 and 1920 rail production was 8.77 per cent and 8.05 per cent respectively of the finished steel total. This wide difference, it is suggested, is not due altogether to Government railroad control nor to lack of funds, nor to any special expansion in other than railroad uses of steel. It is the conclusion of the New York Central engineers that the extensive adoption by the large railroad systems of the 100-lb. and 105-lb. rail, with its much longer life, is already having its effect upon the volume of new rail requirements.

Heavy Steel Shipments by Water

BIRMINGHAM, ALA., Dec. 13.—Movements of Birmingham iron and steel products for the Orient and Pacific Coast out of Mobile this month are breaking prior records. The steamers Steel Importer and Steel Scientist, of the Isthmian Steamship Co., are preparing to load 10,000 tons of rails and track accessories and a large tonnage of ammonium sulphate from the Ensley by-product works for China and Japan. Five ships have either gone or will move during the month for the Pacific Coast with wire, nails, staples, fencing, galvanized iron and sanitary pipe, making practically all ports. Honolulu is taking both wire mill products and pipe via Mobile and San Francisco. The high pressure pipe tonnage for Los Angeles and interior points amounts to 5000 to 6000 tons.

Inasmuch as green is the recognized safety color, and not red, attention has been called to the Industrial Board of Pennsylvania to the desirability of changing the red colors designating exits in theaters and other public gathering places to green. In other words, exits are features of safety, not of danger.

The annual Christmas entertainment of the Pittsburgh Foundrymen's Association will be held at the General Forbes Hotel, Pittsburgh, Monday evening, Dec. 19.

JAPAN ONLY ACTIVE MARKET

Buys in Both the United States and Germany—Chilean Rails Go to German Mill

NEW YORK, Dec. 13.—As the year draws to a close, Japan continues to be the only foreign market showing activity in purchasing in the United States. Undoubtedly a large percentage of current Japanese purchases is being placed in the German market. Besides black sheets, purchasing of which continues fairly active in small tonnages, buying of light and medium section rails is noted. One exporter recently shipped a total of about 1000 tons of 50-lb. rails to Japan. Although Japanese buyers have inquired recently for small and large tonnages of wire and wire nails, shipments of these products are being received from German mills on orders placed during the second and third quarters of the year.

Germany's position in exports seems to be growing worse rapidly, excepting on large orders, where a special effort is made to obtain the tonnage involved. Railroad congestion is so great that it takes from five to six weeks in some instances to move material from interior mills to ports of shipment. Prices, with the exception of quotations on particularly desirable orders, are high. One of the representatives of German mills in the United States was recently offered nails at $4 per 100-lb. on a fairly large tonnage. Contrasted to this, it is reported that American wire nails have been sold as low as $2.25 per keg of 100-lb., c.i.f. Japanese port. Wire is not only high in price but difficult to obtain from German mills, which are engaged in filling old orders. Germany's inability to supply material at present is illustrated in a recent order placed by a Holland company with a large interest in the United States totaling about 250 tons of sheets.

The inquiries beginning to appear in the American market from the Far East for wire shorts are quite evidently being forced here by the German regulation against exports of scrap of all kinds. One inquiry from China calls for 300 tons of wire shorts and to date no mill has been found by the exporters handling this inquiry to accept the order either in full or in part.

German exports are finding their way into other Far Eastern markets than Japan. A medium sized contract for cars was recently placed by the Indian State Railways in India with the Hannoversche Wagon Works and another German car builder has been awarded an order for cars to the value of about 17,000,000 m. from China. One half of the stipulated amount was paid in advance. About 1000 railroad cars have been placed with the Linke-Hofmann Works by the Russian Soviet Government.

Rails for Chile

The order for heavy rails for the Chilean State Railways, inquiry for which was in the American market for several months, has been placed in Germany. A total of about 20,000 tons was involved, of A. S. T. M. specifications and specially rolled to the standards of the Chilean railroads. It was first intended to place this order in Belgium, but German quotations were lower. This is the first time in about 20 years that the annual requirements of the Chilean State Railways have gone to a German mill, although some small orders were placed with a German mill several years prior to the war. These rails involve special rolls, mills in both the United Kingdom and the United States keeping them in stock. The car contract for the Chilean railroads, which after some paring down totaled 500 cars, was divided between the Pressed Steel Car Co. and the American Car & Foundry Co.

Specifications will be issued soon for the steel bridge to be erected at Sydney, Australia. The bridge will be 2600 ft. long with a clearance of 156 ft. The estimated cost is about £6,000,000. When issued, the complete specifications will be available through the United States Bureau of Foreign and Domestic Commerce.

Electrification plans for about 5000 miles of French railroads adds another country to the list which is either engaged in electrification or considering projects for electric railroads. Japan, South Africa and Chile are among the countries which have either let contracts or are receiving bids for performing electrification work.

Great Southern Steel Co. Will Develop Ore Lands

CHICAGO, Dec. 13.—The Great Southern Steel Co., incorporated under the laws of Delaware with $100,000,000 capital stock, was formed by Chicagoans and others to develop 101,000 acres of iron ore and coal lands located 65 miles from Muscel Shoals. The company has taken over none of the existing iron or steel making capacity in the South and is not a part of any of the mergers now under discussion. In the section where the new company has its property, there are 146,000 acres of undeveloped iron ore and coal fields which, according to Robert W. Hunt & Co., engineers, Chicago, will yield 3,000,000,000 tons of iron ore and 1,700,000,000 tons of coking coal. Necessary fluxing material is available in the vicinity. Out of this tract, 45,000 acres have been acquired by Henry Ford and the remaining 101,000 acres are the property of the Great Southern Steel Co. Charles E. Pain, First National Bank Building, Chicago, is attorney for the company, but the names of those financially interested in the project have not been divulged. The incorporation papers were drawn up by the Corporation Trust Co., Chicago, and the incorporators are S. E. Dell, M. A. Bruce and C. H. Blaske, all of Wilmington, Del.

Disposing of Shipping Board Steel

WASHINGTON, Dec. 13.—The Shipping Board has made much progress in disposing of its surplus steel consisting chiefly of plain and fabricated tonnage. It has sold practically all of this material except 110,000 tons at Hog Island. At one time the board had about 350,000 tons located at steel and shipbuilding plants throughout the country.

Plans are being made to dispose of Hog Island tonnage, freeing the board of all of its steel which, being exposed to the weather, is deteriorating in value. The highest price obtained for plain material has been $30 f.o.b. cars, paid for a lot of about 700 tons. Other sales of this grade have been made at prices ranging between $15.60 and $18.50. Fabricated material has brought scrap prices, running from $9 to $11. The Hog Island tonnage is about evenly divided between assembled material and fabricated steel which is not assembled.

Tin Plate Rate to Coast

It has been officially announced that the new rate of $1.20 per 100 lb. on tin plate to Pacific Coast points from Pittsburgh and Eastern mills will become effective Dec. 31. This rate already is in effect from Chicago. It is considered doubtful that the new rate from Pittsburgh and the East will benefit railroads much for the reason that there is a rail and water rate from Pittsburgh, via the Panama Canal, including handling, dockage charges and insurance, of $1.06½ per 100 lb.

The freight haul from Pittsburgh to Baltimore is 33½c. and the water charge from Baltimore to the Pacific Coast is 60c. per 100 lb.

The New England Iron League will hold its annual Christmas dinner on the evening of Dec. 29, at the Boston Athletic Association.

Engineers Discuss Waste Prevention

Machine Shop and Management Wastes Considered—Material Handling Equipment a Topic of Last Week's Meeting of Mechanical Engineers

ELIMINATION of waste was the keynote of the forty-second annual meeting of the American Society of Mechanical Engineers, held in New York, Dec 5 to 9 inclusive. Simultaneous sessions both in the morning and in the afternoon considered power waste; machine shop waste; railroad waste in locomotive and car operation; waste in management; waste in forest products; waste in material handling; fuel waste and aeronautic, textile and ordnance waste.

The session devoted to machine shop waste was held under the auspices of the machine shop division of the society, with F. O. Hoagland, general manager. Reed-Prentice Co., Worcester, in the chair.

All phases of the salvaging of factory wastes including not only scrap metal and other material, but also salvage work in maintenance and repairs, was outlined by J. A. Smith, general superintendent General Electric Co., Schenectady, N. Y., in a paper on "Salvaging Industrial Wastes." Taking up metal wastes first, he gave it as essential that a system should be maintained whereby various grades of metal chips and turnings would be kept separate in the shops during the machine processes, in order to save time and labor sorting and segregating in the scrap or salvage department. He advocated pressing chips and turnings into briquets of suitable cupola size where the tonnage is large, saying that it not only results in higher market value, but also saves in transportation charges. Sheet metal punching scrap, metal strips, trimmings, wire, etc., should always be put up in bundle form and in cupola size for the same reason, he added.

Attention was called to laboratory processes as often productive of valuable wastes, either in the form of metals, such as tungsten, etc., or in the form of various chemical residues which may, through conversion or combination, become the basic elements of new preparations.

A careful system of segregation, he emphasized, should be carried without defeating the purpose of securing the highest market prices by undue expenditure for labor and equipment. It is well, he held, to have all scrap weighed and credited to departments for the twofold purpose of correct accounting and inculcating an interest in salvage work by all department heads.

Repairing Machine Tools at Right Time

He advocated carrying salvage work into other branches of shop activity, such as maintenance of property, repairs to machinery and tools, handling of stocks, and upkeep of all the various classes of small tools. "Systems must be set up governing the distribution and repairs of the various classes of small tools so that the consumption of these will be regulated within certain defined limits of economy and efficient service, in accordance with the production requirements of the shop." Mr. Smith further advocated monthly inspection of machine tools of which records should be kept, in order that repairs may be made at a minimum cost and to avoid costly breakdowns that follow neglect in the matter.

In the supply of small tools to the shop he pointed out that much can be accomplished in reducing expense by efficient methods of distribution and collection. A system of regular inspection of tool rooms, tool cupboards, benches and areas around machine tools should be established in all departments. Tools not needed for current use should be cleared up promptly and returned to stock, and those needing repair put in shape for further requirements. "By a proper system of distribution and collection, the inventory of tool stocks carried may be greatly reduced, expenditures for new tools curtailed, and those in use in the shops kept more constantly in active service."

In the matter of lubrication both of machine tools and of cutting tools, he pointed out that there is opportunity for valuable reduction in the operating expense of the shop. "Selection of oils is most important. Attention needs to be given to the handling and distribution of oils in order to avoid waste. Reclaiming oil from production parts and from chips and turnings is a part of the salvage work of every up-to-date plant," he said.

Salvaging Left Over Material

In reference to reducing inventory he said that the present is the time to make thorough investigation of every department and storage space, and to gather up all surplus or idle materials and make an effort to put them into service, or otherwise dispose of them to advantage. Analysis must be made of the methods of handling and distributing materials with a view of establishing the most economical system and special attention should be given to cutting raw materials to required dimension or multiple thereof. Attention should also be given, he continued, to the salvaging of left-over pieces and parts for further use in some portion of the factory, wherever practicable. For this purpose the central storehouse could figure as a clearing house and thus aid in the general work of salvaging.

As to the human element in the matter, Mr. Smith said, "If we can get department heads, and employees as well, interested in saving everything of inherent value we will perform a valuable service in helping to re-establish industry on a firm and stable basis."

In the discussion L. D. Burlingame industrial superintendent, Brown & Sharp Mfg. Co., Providence, emphasized the idea of impressing foreman, executives and others with the importance of scrap and what money could be saved by salvaging. Employers should take them into their confidence he said, and from time to time let them know the actual money value of the material salvaged. In his closure, Mr. Smith pointed out that it was possible to go too far in the elaboration of waste prevention. In the small shops especially was it to be tempered with common sense. In speaking further of the segregation of scrap he said that he found that it pays in the shops to have properly marked cans, segregating different brasses, babbitts, etc., and this right in the department rather than at the scrap heap.

The human element in the matter of waste was emphasized by J. J. Callahan, Employee's Service, New York, who said that the supreme factor in industry is men and the biggest thing in men is spirit. He gave from his experience several instances of enlisting the co-operation of men and preventing waste to an unusual extent.

What Constitutes an Efficient Milling Cutter

The paper "On the Art of Milling" by John Airey, Ann Arbor, Mich., and Carl J. Oxford, Detroit, presented by the former at this session was a departure from the general topic of the meeting. The paper which was of a comprehensive character and contained numerous illustrations, graphs and tables was available in pamphlet form prior to the meeting. It gives particulars of an investigation undertaken at the University of Michigan through a desire of the National Twist Drill & Tool Co., Detroit, to find a rational basis for the action of a milling cutter, so far as this could be removed from the region of empiricism.

"It is shown," the authors state, "that metal is

removed more efficiently with thick chips than with thin chips. It follows from this that, other conditions being equal, including speed and feed per minute, the cutter with the fewest teeth gives the greatest efficiency. However, it is evident that the efficiencies of two cutters with different numbers of teeth are equal provided the table feeds be adjusted so that the same feed per tooth is affected. This gives a definite working theory on the influence of spacing.

"It is definitely established that for a given material, tooth shape and sharpness, thickness of chip is the sole criterion of the efficiency with which metal is removed in milling and that increase of spacing over that required for free cutting is a handicap. Present day high-powered cutters have several times the chip space needed. Limitation of machine power had doubtlessly been the chief factor in giving a false bias to the influence of spacing."

Formulas for determining the number of teeth for a known diameter of cutter and for determining the depth are included in the paper, as well as a geometrical construction for obtaining the best shape of tooth.

A plea was made that engineering schools devote the same attention to shop processes that is devoted to design topics. The economic results would be greater though not so spectacular, it was pointed out, improvements in basic shop processes affecting the cost of all finished products whereas improvements in design benefit only a limited field. A. L. De Leeuw, consulting engineer, New York, stated in the discussion that the paper was, on the whole, a valuable contribution to the subject, but that some of the points in the second part might be open to objection. Others taking part in the discussion were R. Poliakoff, New York; Carl G. Barth, consulting engineer, Philadelphia; Earle Buckingham, engineer of standards, Pratt & Whitney Co., Hartford; Frank B. Gilbreth, consulting engineer, Montclair N. J.

Making Monotonous Work Fascinating

"Management Waste" was the topic of a session held under the auspices of the management division, with L. P. Alford, vice-president of the society, as chairman. Monotony of work and the "failure to recognize true human nature and its fundamental natural power constantly and forcibly seeking self-expression," as the basic cause of an alarming extent of industrial waste, was a view expressed by W. N. Polakov, consulting engineer, New York, in his paper on "Reducing Waste by Making Work Fascinating." "The task before the engineer of today," he said, "is to overcome the ill effects of automatization and mechanization of industry."

Increasing production by devising labor-saving machinery, while in itself productive of results, had two "by-effects" which greatly reduced the advantages anticipated, he said. These were that automatic high-speed machinery, sold at a high price, increases overhead often in excess of reduction in payroll, materially increasing the capital charges; and that automatic, semi-automatic, high-speed and single-purpose machinery makes work monotonous. "The workers," he continued, "failing to get stimulation and satisfaction from work as mere parts of automatic machinery, demand shorter hours of this drudgery and higher compensation with which to buy the interest, stimulation and pleasure which they fail to find in the work itself."

He did not advocate, however, scrapping existing machinery or putting a ban on further invention or improvement, but indicated that the solution was to be sought in "the development of means of abolishing the industrial monotony and drudgery of work by introducing into it intelligent, self-expressive, creative motives.

He arraigned the Taylor system of management, especially the features of functional foremanship, central planning office, time studies and instruction cards, as contributing to monotony of work, driving the creative element out of his work and lowering the workman to the level of an automaton. "Recognition of these fatal mistakes," he continued, "has prompted industrial engineers to concentrate on the shortcomings of management itself. These efforts have decentralized the detached intelligence of the planning department by establishing manufacturing offices in the shops; have re-united the instructing and inspecting functions of foremanship; and have substituted for time-study clerks the direct interchange of worker's skill and intelligence. Further, these efforts have stimulated interest in the work by training and providing instruments for intelligent control of processes; liberated the suppressed creative instincts of workers by providing them with means for observing their own progress, and finally, devised a charting method permitting the accurate measurement of managerial efficiency separately from the efficiency of the workers."

Why Welfare Work and Incentive Payments Fail

Mr. Polakov outlined the effect of monotony in causing unnecessary fatigue, and therefore waste. In speaking of recreational welfare work, he said that "this movement is obviously directed along the wrong course. It attempts to divert the attention from work to recreation," the moral effect being degrading because of the silent admission for one thing, that special reward and entertainment is to be looked for outside of one's vocation. As to the incentives to higher production, he characterized profit sharing, differential piece rates, incentive payments, etc., as obviously unfit, from the point of view of securing the worker's interest in the work itself, because they merely create interest in securing larger pay.

He held further that "Any wage system in order to comply with human nature should not confuse incentives for acquisitive passion with adequate provisions enabling wage earners to reach a higher plane of cultural and productive development. This aim can be attained by a two-rate wage, as developed and practised by the author; it consists substantially of a fixed rate of wage based on time and class of work, and a secondary rate of wage based on actual exercise of skill, knowledge and intelligence."

The hopes aroused by the claim that careful selection of workers to fit the work will eliminate dissatisfaction created by the poor fitting of men to jobs, he characterized as another notable attempt to combat the evils arising from the lack of interest caused by mechanized work, and as a waning hope. "The correct course," he said, "would be to fit the jobs to the men, in other words, to elevate the work to human dimensions, requiring not mere physical or animal power, but an exercise of creative intelligent faculties as well."

"In order to eliminate a major part of our industrial losses," Mr. Polakov said, in concluding, "the creative intelligent impulses of men should be given the fullest opportunity of self-expression. As an ideal we may foresee a complete abolition of monotonous, automatic, repetitive operations performed by men. These should be relegated to machines, while men should assume the part of directors and supervisors of processes. The greatest source of waste is to be found in the idleness of our available knowledge and creative capacities of men, which are not liberated and applied under the mechanistic, formal organization."

Mr. Polakov's paper was discussed enthusiastically and disagreement expressed with many of his views. Samuel Gompers, president American Federation of Labor, was unable to be present as scheduled, but telegraphed a statement which read in part as follows:

"Mr. Polakov's paper presents fundamentals in such a cogent way that Labor is anxious to have his statement widely discussed. The human element in production is that which is most important, though it has long been ignored. It was the organized labor movement that forced consideration for it by focussing attention on wages and hours. We forced higher valuation of human work as expressed in terms of money. But demands for higher wages and reasonable work periods were only means to an end. Higher wages mean increased opportunities for living and shorter hours mean control over time. It is ability to use time in all its dimensions that distinguishes man from lower classes of life.

"Labor realizes that upon management devolves the responsibility of developing the technique necessary to

provide the method whereby the creative ability we seek to conserve shall be released through the opportunity to use brain, skill, and human power in production."

To Improve Processes by Visualizing Them

A method of visualizing processes in their entirety, for the purpose of improving them, was outlined in a paper on "Process Charts," by F. B. and L. M. Gilbreth, consulting engineers, Montclair, N. J. The process chart, it was explained, is a record of present conditions, presenting in simple and compact form the data necessary before improvements in existing conditions and methods are undertaken. It was characterized as not only the first step in visualizing the one best way to do work, but as useful in every stage of deriving it.

The procedure for making, examining and improving a process was given to be preferably as follows: 1. Examine the process and record with rough notes and stereoscopic diapositives the existing process in detail. 2. Have a draftsman copy rough notes for blueprinting, photographic projection and exhibition to executives and others. 3. Show the diapositives with stereoscope and lantern slides of process charts in executives' theatre to executives and workers. 4. Improve the present methods by the use of a suggestion system; written description of new methods; standards; standing orders; motion study; and micromotion studies and chronocyclegraphs for obtaining and recording the one best way to do the work. 5. Make a process chart of the process as finally adopted, as a base for still further and cumulative improvement.

The various steps in the process were taken up in detail and standard symbols, standard change order blanks and other components illustrated. In conclusion the authors pointed out that while the process-chart methods will be helpful in any kind of work and under all forms of management, the best results can come only where there is mechanism of management that will enforce and make repetitive the conditions of the standards.

In a paper on the Rochester shoe wage arbitration, presented by the author, Sanford E. Thompson, Boston, who was chairman of the Arbitration Board, particulars were given regarding the proceedings. An interesting feature of this case was that the workers presented as a substitute for the 25 per cent wage reduction asked for by the shoe manufacturers, a plan designed to lead up to the elimination of waste in manufacture through scientific methods and the adjustment of wages on a scientific basis involving job analysis and time study.

In summarizing, Mr. Thompson said, "The Board was particularly impressed with the evident sincerity of the officers of the Union in advocating treatment by scientific methods. The author believes that if there can be fostered the spirit of our inquiring into facts and the substitution of facts for opinion in settling disputes, and further, if disputes can be prevented by study of facts, a long step forward will have been taken."

In outlining the proceedings the facts considered in reaching the decision, including cost of living, earnings of workers, possibilities of reducing costs through other means than wage reductions, etc., were given, as well as the text of the decision finally rendered.

When Material Handling Machinery is Justified

Elimination of industrial waste in material handling was discussed on Thursday under the auspices of the Materials Handling Division, R. M. Gates, presiding. The speaker was E. V. Coes, Philadelphia, chief engineer, Deere & Co., Moline, Ill. He strongly urged the informing of the manufacturer, engineer and the public on material handling equipment lines. The job of the engineer, he said, is the co-ordinating of various types of equipment for a given purpose. What the material handling industry needs is analysis; the economic functions should be defined and the co-relation of various types of equipment should be taken up.

R. H. MacLain, author of an article on material handling equipment, which appeared in the April issue of the *General Electric Review*, was introduced by Mr. Coes and exhibited and explained a number of stereopticon slides, showing the development and use of material handling equipment from the hand truck to the power driven industrial truck and overhead cranes and hoists.

Mr. Coes pointed out the formula of William F. Hunt in "Handling Materials in Factories," which he had quoted in his paper and discussion centered about this method of arriving at a satisfactory figure for the investment justified by the saving in an installation of material handling machinery. This formula suggests that the variables in the investment value may be classed as follows:

A = interest charges on investment, per cent
B = interest to provide for upkeep of apparatus installed, per cent
C = interest to provide for depreciation due to age, per cent
D = interest to provide for progress in the art of the particular device proposed (subsequent inventions), per cent
E = interest to provide for extensions to service, per cent
H = additional superintendence and overhead expenses due to change in method, per cent
K = interest to provide for taxes, per cent
F = cost of power, supplies and other variable items in dollars per year

Let S = yearly saving in labor in dollars
and Z = investment in dollars justified by these considerations

then $$Z = \frac{S\ (X \text{ per cent}) - F}{(A + B + C + D + E + H + K) \text{ per cent}}$$

Working this out for an assumed set of conditions, assume that the work which under the present methods of moving materials requires four men employed at $3 per day, 300 days per year, at a yearly cost of $3600, can be done according to the new method by one man, costing $900, thus saving $2700 per year. The plant operates on shift, men employed 80 per cent of the year.

Then $X = 80$ per cent; $C = 15$ per cent; $H = 3$ per cent
$S = \$2{,}700$; $D = 10$ per cent; $K = 3$ per cent
$A = 6$ per cent; $E = 3$ per cent; $F = \$400$
$B = 20$ per cent

and $$Z = \frac{(\$2{,}700 \times 0.80) - 400}{0.60} = \$2{,}933.33$$

James H. Shepard, Shepard Electric Crane & Hoist Co., Montour Falls, N. Y., in a short written discussion of Mr. Coe's paper said that as the factor H in the formula might be either + or — he doubted its value and suggested the addition of still another factor G concerning the saving accomplished by using the equipment. Mr. Shepard commended the formula and suggested that it might with only slight improvement be used commercially. He also urged the standardization of costs.

Another speaker in the discussion, H. M. Lane, industrial engineer, Detroit, Mich, who specializes in foundry construction, pointed out that it has been his experience in laying out foundries that one of the greatest obstacles to overcome in the installation of material handling equipment in a new building is the objection of the architect and builder to changing their plans sufficiently to allow room for a successful installation. The question of perhaps one foot more of headroom than has been provided in the plans is sometimes opposed so convincingly by the architect and builder from the standpoint of additional cost as to prevent the engineer from arranging for proper equipment installation. W. C. Brinton, consulting engineer, New York, said that the formula prepared by Mr. Hunt appeared to be of value only in a plant already operating, and objected that in the case of a new plant it was still entirely up to the engineer. Among other speakers in the discussion were William F. Hunt, author of the article which contained the formula under discussion, and S. H. Libby, Sprague Electric Works of the General Electric Co.

New York Steel Treaters' December Meeting

At the regular December meeting of the New York Chapter of the American Society for Steel Treating, in the Engineering Societies Building, 29 West Thirty-ninth Street, New York, on Wednesday evening, Dec. 21, F. P. Gilligan, president of the national organization, will deliver an illustrated lecture on "What Happens to Steel When You Heat and Quench It." Non-members are invited.

High Rates on Iron Ore to Be Restored

Interstate Commerce Commission Declines to Permit Railroads to File Tariffs on Short Notice for Extension of Reduced Rates to March 31

BY L. W. MOFFETT

WASHINGTON, Dec. 13.—Freight rates on iron ore from Lake Erie ports to interior furnaces are to be restored by Jan. 1 to their high levels prevailing before they were lowered 28 per cent on Oct. 18. Decision to this effect was announced yesterday afternoon by the Interstate Commerce Commission. It came in the form of a refusal to permit the railroads to file tariffs on short notice under the sixth section of the Interstate Commerce Commission for the extension of the reduced rates from Jan. 1 to March 31. In consequence the railroads will be unable to make good their promise to interior furnaces, given at a recent meeting in New York, to extend until March 31 the tariffs on file which lowered the rates.

Victory for Lake Interests

The action of the commission is a victory for lake front iron and steel interests which had asked that the old ore rates be restored on Jan. 1 and that the commission decline the request of the carriers to file short notice tariffs in order to extend the date to March 31. Informal hearing on the sixth section application was held before members of the second division of the commission last Wednesday. The lake front interests maintained that the lowering of rates on iron ore in the absence of reduction in rates on coal and coke to the plants on the lake front constituted discrimination. Interior furnace interests contested this theory and claimed that there is no relationship between rates on iron ore and rates on coal and coke. Apparently the commission in refusing to grant the extension to March 31 has accepted the contention that such a relationship does exist, and some have interpreted the ruling as meaning support of the often cited argument in favor of the assembly cost of raw materials entering into the manufacture of pig iron. Aside from claiming that such a relationship does not exist, interior furnace interests also maintained that the extension of the lower rates should be granted because some of the tariffs fixing lower rates on ore from Lake Erie ports are made permanent, while others would expire automatically on Jan. 1 unless extended. Such a condition would prove chaotic. They further pointed out that lower rates on imported ore are made permanent, and that this would further confuse the situation and be the source of discrimination. No mention, however, was made of the fact that the rates on ore in Southern territory have been lowered without limitation, and apparently the subject was not brought up because the item of competition may not have been thought to be sufficiently important.

Lower Rates on Imported Ore

It is assumed, however, that where tariffs have been filed on the regular 30 days' notice extending the lower rates to March 31 the commission will order suspension and that it will have to take similar action with regard to lower rates on imported ore.

In making its ruling the commission specifically states that its action "is in no sense to be interpreted as a disinclination to approve justifiably lower rate levels, but is based upon the continuance of premature reductions confined to certain rates, the outcome of which is to unduly prejudice iron and steel manufacturers on the lake front to the advantage of competing interior furnaces."

Interior furnace representatives say that the effect of the commission's ruling will be to stop shipments of iron ore from Lake Erie docks after Jan. 1, but that meanwhile the movement, greatly stimulated under the lowered rates, will be further increased until that time.

The final outcome of the ruling on the rate structure of fuel and ore is purely problematical. It is believed, however, that this case, along with requests for reductions in rates on manufactured iron and steel, will be brought before the commission in the course of the general rate investigation which begins to-morrow.

The Commission's Statement

The commission issued the following statement relating to its ruling refusing the request of the carriers to file short notice tariffs:

The commission to-day declined to issue special permissions under the sixth section of the interstate commerce act to allow carriers in Eastern territory to continue from Jan. 1 to March 31, 1922, inclusive, reduced rates on iron ore. The commission's action is based upon protests of shippers located at Buffalo, Cleveland, Erie, Chicago and other lake ports alleging that the proposed rates result in undue discrimination against them and preference for competing furnace interests at Pittsburgh and other interior points.

Coal and iron ore are two of the important elements entering into steel manufacture. Most of the iron ore used in the East comes from Minnesota by lake. Lake front furnaces, therefore, pay no rail freight charges on ore, but transport their coal by rail from Pittsburgh and other interior points. Interior furnaces, on the other hand, while paying rail freight from Lake Erie ports on ore, are in most cases located in close proximity to the coal fields and pay only short haul rates on coal.

In 1917 iron ore was transported from Lake Erie ports to Pittsburgh for 82c. per ton of 2000 lb., whereas coal was charged $1.40 per ton from Pittsburgh to Buffalo, a difference of 58c. per ton. Iron ore rates in the East were not increased during federal control, but coal rates were increased approximately 25 per cent. Rates on both commodities were increased in August, 1920, resulting in rates on ore and coal of $1.14 and $2.51, respectively.

Under the adjustment now proposed by Eastern railroads the ore rate would be 82c., or the same as in 1917, whereas the coal rate would continue $2.51, including the increases of 1918 and 1920 and being higher by $1.69 per ton, or 206 per cent, than the ore rate. The rates on iron ore which will apply after Jan. 1, 1922, will include materially less increase over the pre-war basis than rates on commodities generally—even less than the reduced rates on farm products soon to be made effective.

The action of the commission is in no sense to be interpreted as a disinclination to approve justifiably lower rate levels, but is based upon the continuance of premature reductions confined to certain rates, the outcome of which is to unduly prejudice iron and steel manufacturers located on the lake front to the advantage of competing interior furnaces.

Proceedings at the Hearing

Commissioner Daniels, head of the second division, with Commissioners Esch and Campbell, and Director of Traffic Hardie, presided at the informal hearing last Wednesday, concerning the sixth section application of the railroads asking permission to continue the lowered rates on iron ore until the period mentioned by being granted permission to file tariffs to this effect on short notice.

Attorney Francis B. James, representing the lake front interests, strongly combatted the granting of the application, claiming that his clients are being dis-

criminated against because they have not been granted lower rates on coal and coke, while interior furnaces are getting the advantage of reduced rates on iron ore. Representatives of the railroads and interior furnaces were equally as vigorous in their support for the granting of the application.

Speaking for the eastern interior iron and steel interests was Charles S. Belsterling, commerce counsel for the United States Steel Corporation. L. C. Bihler, traffic manager of the Carnegie Steel Co., Pittsburgh, appeared for that company, the National Tube Co. and the American Steel & Wire Co. F. A. Ogden, traffic manager of the Jones & Laughlin Steel Co., Pittsburgh, represented independent iron and steel interests in the Pittsburgh district, the Mahoning and Shenango Valleys, Wheeling district, and surrounding territory. N. L. Moon, traffic manager of the Alan Wood Iron & Steel Co., spoke for the Eastern Pig Iron Association. The chief spokesman for the railroad was W. S. Kallman, assistant counsel for the New York Central Railroad.

Why Ore Rates Were Lowered

Broadly, the position of the railroads and interior producing interests was that the ore rates were lowered in order to stimulate the iron and steel industry, involving the movement of iron ore and for the purpose of providing immediate revenue to the carriers. Mr. Kallman said that coal and coke rates had not been reduced because, unlike the situation as it applies to ore, the reduction could not be confined to the steel industry but would involve the entire traffic of fuel and he contended that the railroads could not afford the loss of revenue which he claimed would result from such a cut in rates. The interior iron and steel people agreed with Mr. Kallman as to the purpose of reducing iron ore rates, but made it plain that they distinctly were in favor of a reduction of rates on coal and coke. They maintained, however, that the reduction in ore rates has not constituted a discrimination against lake front interests. Mr. Ogden said that relatively rates on ore from Lake Erie ports to interior furnaces still are higher than are rates on coal and coke from the Pittsburgh and Connellsville district, respectively, to Buffalo.

Hauled Under New Tariffs

As evidence of the justification of reducing ore rates, Mr. Ogden stated that the railroads had hauled 250,000 tons of ore under the new tariffs. This, he explained, was an unprecedented movement during the period involved, from Oct. 18 to Dec. 1, and compares with an average movement of 50,000 tons. He said that unless the lower rates remain in effect the furnaces will stop these shipments, which, because of the depressed condition in the iron and steel industry, are not needed, but are being stocked at furnace yards. The stimulated movement is explained by both representatives of railroads and the interior producers as having two principal objects in view, one of them being the movement of ore from the docks before it becomes frozen, and the other to have the docks cleared when the lake navigation season opens. Railroad representatives stated that there are 1,800,000 tons of ore on the docks of Ashtabula Harbor, Ohio.

It was stated that it is hoped the iron and steel industry will have revived by that time, and if it does, there will be large shipments of ore originating from Lake Superior mines, and it would be impossible to handle them unless the docks provided space, and also by reason of the fact that the railroads would be short of cars, inasmuch as they have an unusually large amount of rolling stock in bad order.

Another argument which the railroads made for granting of the application was that some of the tariffs would automatically restore the old rates on Jan. 1, unless extension of time was specifically granted while others are made permanent. This would result in chaotic conditions, they stated.

Rates on Imported Ore

Mr. Belsterling also pointed out that the reduced rates on imported ore over the Lehigh Valley Railroad from Constable Hook, N. J., to South Bethlehem, Pa., and over the Chesapeake & Ohio Railroad from Newport News, Va., to Virginia furnaces, have been made permanent. These rates, which were reduced before the domestic rates were cut, Mr. Belsterling pointed out, would constitute discrimination against Eastern users of New Jersey and eastern Pennsylvania ores. The rate to eastern Pennsylvania, Mr. Belsterling said, is $1 per gross ton, and he added that, if that were a proper rate to South Bethlehem and other points, a proportionate rate for Buffalo ought to be $1.55. Mr. Belsterling said that the imported ore is brought in at low prices and that it would be impossible for the Eastern furnaces to exist if the rates on ore from the docks were not down. He said that he did not think there was any relation between coal and coke and ore, but maintained that Buffalo has the lowest relative rate on bituminous coal out of a number of places he had chosen at random. This rate, he said, was 49.7 per cent of the New England sixth classification rate. He said the same situation applies largely as to coke. He further stated that the rate on coke to Buffalo and in the Connellsville region, is 65 per cent of the New England sixth class rate.

Cost of Making Pig Iron

Replying to a statement by Mr. James that it costs Buffalo furnaces $24 to make a ton of pig iron and that it is selling at $20 a ton, Mr. Belsterling said it would cost $28.50 a ton to manufacture pig iron at Eastern furnaces, paying $1.55 a ton on ore.

Mr. Bihler said that the companies which he represented have 78 blast furnaces, of which 10 are located on the lake front, pointing out that these 10, although not getting any advantage from the lowered ore rates, want to see them continued. He also said, in reply to a statement that the Bessemer & Lake Erie Railroad, a Steel Corporation subsidiary, benefited from ore traffic, that this carrier handles ore for only 31 of the 78 furnaces. He told the commissioners that if they granted the request of the Buffalo producers it would be an undue hardship against the steel industry, which he described as being "already sick." He said that shipments amounting to 50,000 tons of ore had been made to the Carnegie Steel Co. since the reduced tariffs went into effect.

Like his colleagues, Mr. Bihler was unable to say how old rates could be restored without causing confusion.

Commissioner Daniels asked Mr. Bihler why there should be a reduction in rates on one commodity, the outcome of which would be to lessen costs for some furnaces, while there were no reductions on other commodities to lessen the cost on other furnaces. It was considered significant that Commissioner Daniels expressed the belief that if the adjustments of rates between coal and coke on the one hand, and ore on the other was equitable before the ore rates were reduced, then the relationship would be disturbed. The answer of representatives of the railroads and interior producers was that there is no proper relationship.

Claim of Buffalo Producers

Mr. James, however, insisted that there is a relationship between these commodities and that the Buffalo producers are being strongly discriminated against. He even charged that interior producers were trying to drive Buffalo manufacturers out of business. He pointed out that when ore rates were increased 28 per cent during the war, amounting to 30c. per ton, the burden was shifted to the head of the lakes so that the lake front interests had to pay this added transportation because, while there was no additional charge for the interior furnaces from Lake Erie ports. Rightfully, the railroads carrying ore from the mines to the upper docks should have been allowed an increase of only 8c., and railroads from the lower docks allowed 22c. of the increased rate. He said that the reduced rates to interior furnaces gives these interests an advantage of 71c. per ton in the cost of producing pig iron and that regardless of what action may be done on the sixth sec-

tion of the application, these furnaces have derived a big benefit because of the large tonnage they have moved after the reduced rates, and stocked at their yards.

For the purpose of showing the so-called inequitable relationship in rates, Mr. James stated that the ore rate from Buffalo to the Reynoldsville district in Pennsylvania is only 26 per cent of the coal rate from the Pittsburgh district to Buffalo, despite the fact that ore is twice as valuable as coal. He said that the Buffalo interests are not opposed to the lower ore rates themselves, but do vigorously object to the discrimination they have to suffer because of the fact that coal and coke rates have not been reduced.

In asking the commission to deny the sixth section application, he requested it to suspend tariffs and to have the question of ore rates taken up in connection with all other rates at the general investigation which the commission has ordered to begin tomorrow. Interior steel interests announced that they intend to press for lower rates on coal, coke and iron and steel products at the investigation when the shippers' side is taken up in January.

WILL INSPECT SHIPS

Navy Department Seeks Advice of Experts as to Disposing of Tonnage

WASHINGTON, Dec. 13.—Desiring to get practical ideas in connection with the creating of a ship salvage industry in this country, Rear Admiral Potter, Paymaster General of the Navy, has arranged for a meeting at Philadelphia, Friday of the present week, between the naval officials and financiers, steel manufacturers, scrap dealers, shipbuilders, representatives of chambers of commerce, and presidents of trade paper publishing companies. The delegation will inspect obsolete ships which have been advertised for sale on Jan. 16. Among those at the Philadelphia yard are the battleships Maine, Missouri and Wisconsin, the cruiser Columbia, the monitors Ozark and Tonopah, and the destroyer Smith. Other cruisers included in the list of obsolete vessels advertised for sale are the Colorado, Memphis and Brooklyn. The displacement of the cruisers range from 7,000 to 15,000 tons each, of the battleships approximately 13,000 each, and of the monitors, 4 in number, about 6,000 tons each.

Tonnage to Be Scrapped

Estimates have been made that the ships advertised for sale represent about 100,000 tons of metal. The total quantity would be brought up to about 700,000 tons, according to calculations made, if the ship scrapping program as suggested at the Conference on Limitation of Armament is adopted. This takes into account old battleships still in the naval service, nine being built and six battle cruisers under construction. However, there is a growing sentiment in favor of laying the question of disposition of these vessels before experts outside of the Conference, to be handled through diplomatic negotiations or otherwise. Should this be determined upon, it is probable that a number of old ships as well as some of those being built, would be converted into merchant vessels. It has been suggested, for instance, that three of the six American cruisers being built could be made into fast passenger liners. These three ships have been completed up to the waterline and naval experts say that it would be possible to continue construction so as to produce a purely passenger vessel instead of a potential cruiser.

An Important Point

In the event it is finally determined to convert the ships instead of scrapping them, it is assumed that this would have a vital bearing on any program as to the establishing of a salvage industry. Necessarily the latter would take on a more limited operation, requiring less finance, and yielding smaller tonnages of old material to be consumed by the steel trade. Such a limitation might discourage those who otherwise would be willing to enter into financial arrangements connected with the salvaging plan, although some naval officials do not expect such a development. They say that steel makers, scrap dealers and ship builders have shown interest in the proposed salvaging industry and are hopeful that concrete suggestions will grow out of the meeting in Philadelphia, not alone as it relates to the proposed scrapping program but as it relates to merchant and other ships in the future.

The fact that such an industry has been established in England has encouraged the belief that it could be operated in the United States, although obviously the geographical and industrial conditions are dissimilar and probably would call for a modified plan in this country. At the same time, steel manufacturers have expressed the belief that it is feasible either to beach the ships at points nearest consuming steel centers or where the facilities are available to place them in dry docks in preparation for dismantling through the use of the acetylene torch or some other practicable method. Naval officials have indicated that they hope to get at least $10 per ton for displacement of the dismantled ships, but particularly in view of the present condition of the steel market, it is not believed that this expectation is well founded. Offers so far made by steel producers have not exceeded $8 per ton for the steel itself, which in tonnage represents about 75 per cent of the displacement.

It has been pointed out that it would be a costly operation to remove the steel, boilers, engines and other equipment, some of which will be practically without value, and that after this is done, it will be necessary in the case of metal to be used for scrap, to sort it and cut it to charging size, preliminary to transportation to the mills.

Camden Iron Works Sold

The Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa., has purchased from the receivers of the Camden Iron Works, Camden, N. J., all patent rights, patterns, etc., used in the manufacture of hydraulic tools and high-pressure valves. The Camden Iron Works has sold for many years through R. D. Wood & Co. of Philadelphia and others. The purchase of the Birdsboro Steel Foundry & Machine Co. includes the machinery, jigs, templets, etc., required for the production of operating valves and all stock which was in process of manufacture at the time of purchase. This deal places the Birdsboro Steel Foundry & Machine Co. in a position to supply hydraulic equipment of every character.

A part of the plant of the Camden Iron Works has been purchased by the U. S. Cast Iron Pipe & Foundry Co., Philadelphia.

The United States Cast Iron Pipe & Foundry Co., Philadelphia, has purchased from the receivers of the Camden Iron Works the patterns, patents, etc., covering the line of gas producers, Thiessen scrubbers, gas holders and miscellaneous work, with the exception of the hydraulic machinery units which were purchased by the Birdsboro Foundry & Machine Co. The United States Cast Iron Pipe & Foundry Co. has organized a new department to take care of this work, in charge of C. D. Mathews, who was manager of the Camden Iron Works, for the receivers.

The November wage distribution of $3,645,873 at Youngstown, Ohio, compares with $3,441,761 in October and a low of $3,323,982 in July. Total disbursement for the first 11 months of the year is approximately $46,500,000, and for the year will approximate $50,000,000. This will compare with $95,247,736 in 1920, the largest yearly payroll.

A general specification of alternating current motors for the main roll drive of a rolling mill has been compiled by and is available in pamphlet form from the Association of Iron and Steel Electrical Engineers, 1007 Empire Building, Pittsburgh.

Iron and Steel Markets

YEAR-END UNCERTAINTY

Buying Waits on 1922 and Freight Rate Readjustment

Pig Iron Lower in the East—Reduced Operation Likely in Holiday Time

In both pig iron and finished steel markets the near approach of the year-end is evident in two respects. Producers have been more disposed to make concessions to improve their cash position and consumers have limited their buying so that inventory might be brought down to its lowest terms. These influences have created fresh uncertainties as to the prices at which the larger business looked for in the new year will be done.

The belief is widespread in the trade that reductions in freight rates will come early in the new year and that the decision by the Commerce Commission to restore the higher iron ore rates on Jan. 1 does not mean opposition to a reasonable reduction. It may prepare the way for a general rather than piecemeal reduction.

Some contraction in mill operations is seen in the Pittsburgh and Ohio districts. The banking of a number of blast furnaces in the mid-holiday week is probable and some steel plants may run at a correspondingly reduced rate.

Irregularities in prices attract more attention under a reduced volume of new business. Rather more deviations from Pittsburgh basing appear in the Chicago district and Pittsburgh manufacturers who would take Eastern business in the heavier products find that they must compete with less than 1.50c., Pittsburgh.

In bars business with jobbers has been done at 1.45c., Pittsburgh, and in wire nails Southern Ohio mills have gone well below $2.75. Production tin plate has sold at $4.65 per base box.

There is better adherence to usual prices for sheets than in other lines, also a somewhat steadier market for wrought pipe.

Some plate orders have been taken at 1.45c., Pittsburgh. There is also the incident of German plates offered for tank work in Texas at the equivalent of 1.16c., Pittsburgh, but low German prices are more than offset by uncertainties as to product and delivery.

The failures of German mills on deliveries are illustrated in the placing of an order by Holland in the United States for 250 tons of sheets. Meanwhile 20,000 tons of rails for Chile have gone to Germany and also railroad cars for India. Two American builders divided 500 cars for Chile.

The Norfolk & Western has placed 40,000 tons of rails, 24,700 tons going to Bethlehem and the remainder to Johnstown and Pittsburgh district mills. The Burlington order now promises to be less than the 38,000 tons first considered.

New car orders are dealt out with a sparing hand, but repair business is offered again in volume. The Norfolk & Western is considering repairs to 4000 cars, the Seaboard Air Line to 1500 and the Union Pacific to 500. Repairs on 1000 have been ordered by the Chesapeake & Ohio. The Central Railroad of New Jersey is in the market for 25 locomotives and the Central of Georgia for 300 cars.

Strong competition of furnaces in New York State and Pennsylvania have developed a marked weakness in the pig iron market in the East. On sales aggregating 7500 tons to a Massachusetts melter, recent quotations were sharply shaded, $19.30, eastern Pennsylvania furnace, being made. In the South, $17.50 is now the fully recognized quotation. Fair activity has taken the place of the extreme dullness which existed in the Pittsburgh market, where prices are being maintained. This is also true in the Chicago district. There are signs that good buying of pig iron may come after Jan. 1, also that ore liquidation will continue to influence prices.

A Detroit automobile plant is out for 5000 tons of soft steel bars and 2000 tons of cold drawn wire for January-February delivery. In general foundries making automobile castings are going at 20 to 30 per cent.

Structural work continues an encouraging feature in volume, but prices remain low. Of awards for the week, about 17,000 tons, three-fourths went to the East; and of the 12,000 tons of fresh projects the greater part is in New York in spite of threatened labor troubles there in the building trades.

In the export field improved exchange, events at Washington and the prospect of an economic conference on European problems have brought a better outlook. Continued buying from the Orient is indicated.

November steel ingot production showed a slight gain, and 20,000,000 tons may be reached for the year, compared with nearly 41,000,000 tons in 1920.

British iron and steel output increased in November. The year's pig iron total is now put at 2,650,000 tons, or one-third of last year's. In steel 3,750,000 tons is the estimate for 1921, against 9,050,000 tons last year.

Pittsburgh

PITTSBURGH, Dec. 13.

Demand for steel products still is on a tapering scale, particularly on those lines which reach ultimate consumers through jobbers. The latter, of course, want to avoid building up stocks with inventories so close at hand, but this does not explain the lack of buying by those who manufacture further, these interests being influenced by the development of fresh uncertainties in prices. Observance of the Pittsburgh basing point by companies outside the Pittsburgh district is limited, and this condition finds reflection in numerous reports of prices considerably below those named by Pittsburgh district mills. It is reported that a price of 1.40c., Chicago, was done on the plates required on a big order for tanks recently placed, while southern Ohio wire mills are credited with having taken business in nails at $2.50, base, per 100 lb., Ironton. Pittsburgh manufacturers who would do business in the major products in the East find they must compete with less than 1.50c., Pittsburgh, on these lines. There is closer adherence to regular quotations on sheets than on any other line of finished material and the market is somewhat steadier on tubular goods than it was recently,

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Dec. 13, 1921	Dec. 6, 1921	Nov. 15, 1921	Dec. 14, 1920
No. 2X, Philadelphia‡	*$22.26*	$22.34	$22.84	$34.79
No. 2, Valley furnace†	20.50	20.50	20.50	36.00
No. 2 Southern, Cin'ti†	22.00	22.00	22.50	42.50
No. 2, Birmingham, Ala.†	17.50	17.50	18.00	38.00
No. 2 foundry, Chicago*	20.00	20.00	21.00	35.00
Basic, del'd, eastern Pa.	21.00	21.00	20.50	33.86
Basic, Valley furnace	19.00	19.00	19.00	33.00
Bessemer, Pittsburgh	21.96	21.96	21.96	36.96
Malleable, Chicago*	20.00	20.00	21.00	35.50
Malleable, Valley	20.00	20.00	20.00	36.00
Gray forge, Pittsburgh	21.46	21.46	21.96	36.96
L. S. charcoal, Chicago	31.50	31.50	31.50	51.00
Ferromanganese, del'd	60.00	60.00	60.00	110.00
Rails, Billets, etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$40.00	$40.00	$40.00	$57.00
Bess. billets, Pittsburgh	29.00	29.00	29.00	43.50
O.-h. billets, Pittsburgh	29.00	29.00	29.00	43.50
O.-h. sheet bars, P'gh	30.00	30.00	30.00	47.00
Forging billets, base, P'gh	32.00	32.00	35.00	51.00
O.-h. billets, Phila.	34.74	34.74	34.74	49.24
Wire rods, Pittsburgh	38.00	38.00	40.00	57.00
Skelp, gr. steel, P'gh	1.50	1.50	1.60	3.00
Light rails, Pittsburgh	1.55	1.55	1.55	3.00
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	1.95	1.95	1.95	3.85
Iron bars, Chicago	1.65	1.65	1.65	3.25
Steel bars, Pittsburgh	1.50	1.50	1.50	2.35
Steel bars, Chicago	1.60	1.60	1.75	2.73
Steel bars, New York	**1.88**	1.80	1.80	2.73
Tank plates, Pittsburgh	1.50	1.50	1.50	2.65
Tank plates, Chicago	1.60	1.60	1.75	3.03
Tank plates, New York	*1.83*	1.88	1.88	3.03
Beams, Pittsburgh	1.50	1.50	1.50	2.45
Beams, Chicago	1.65	1.65	1.75	2.83
Beams, New York	1.88	1.88	1.88	2.83
Steel hoops, Pittsburgh	2.00	2.00	2.25	3.05

*The average switching charge for delivery to foundries in the Chicago district is 70c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire,	Dec. 13, 1921	Dec. 6, 1921	Nov. 15, 1921	Dec. 14, 1920
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh	3.00	3.00	2.75	4.35
Sheets, galv., No. 28, P'gh	4.00	4.00	3.75	5.70
Sheets, blue an'l'd, 9 & 10	2.25	2.25	2.25	3.55
Wire nails, Pittsburgh	2.75	2.75	2.90	3.25
Plain wire, Pittsburgh	2.50	2.50	2.60	3.25
Barbed wire, galv., P'gh	3.40	3.40	3.55	4.10
Tin plate, 100-lb. box, P'gh	*$4.65*	$4.75	$4.75	$7.00
Old Material, Per Gross Ton:				
Carwheels, Chicago	$16.00	$16.00	$17.00	$24.00
Carwheels, Philadelphia	*16.50*	17.00	17.00	27.00
Heavy steel scrap, P'gh	14.00	14.00	14.50	17.00
Heavy steel scrap, Phila.	11.50	11.50	12.00	16.00
Heavy steel scrap, Ch'go	*11.00*	11.50	12.00	16.50
No. 1 cast, Pittsburgh	*16.00*	16.50	17.50	27.00
No. 1 cast, Philadelphia	*16.50*	17.50	17.50	26.00
No. 1 cast, Ch'go (net ton)	*12.50*	13.00	13.75	18.50
No. 1 RR. wrot., Phila.	*14.50*	15.50	16.50	20.00
No. 1 RR. wrot, Ch'go (net)	10.50	10.50	12.50	14.50
Coke, Connellsville,				
Per Net Ton at Oven:				
Furnace coke, prompt	$2.75	$2.75	$3.00	$6.00
Foundry coke, prompt	*3.75*	4.00	4.25	7.00
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	13.75	13.75	13.25	14.00
Electrolytic copper, N. Y.	13.50	13.50	13.00	14.00
Zinc, St. Louis	*4.85*	4.87½	4.72½	5.90
Zinc, New York	*5.20*	5.37½	5.22½	6.00
Lead, St. Louis	*4.40*	4.45	4.35	5.00
Lead, New York	4.70	4.70	4.70	4.85
Tin, New York	**32.75**	31.75	28.50	33.00
Antimony (Asiatic), N. Y.	4.50	4.50	4.65	5.50

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, Dec. 13, 1921, Finished Steel, 2.135c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel.

Dec. 6, 1921,	2.135c.
Nov. 15, 1921,	2.113c.
Dec. 14, 1920,	3.146c.
10-year pre-war average,	1.684c.

Composite Price, Dec. 13, 1921, Pig Iron, $19.46 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

Dec. 6, 1921,	$19.47
Nov. 15, 1921,	19.81
Dec. 14, 1920,	34.47
10-year pre-war average,	15.72

due to the fact that orders are coming along steadily and in volume sufficient to make most manufacturers a little less eager for business at the prices which recently have been done.

Actual business has been done in production tin plate at $4.65 per base box, Pittsburgh, and while this price is considerably below cost, there evidently is not enough business to go around, and this remains a quotation on attractive orders.

In keeping with the lighter demand for steel, is a further contraction in the activities of most of the companies in the Pittsburgh and nearby districts. The Carnegie Steel Co., for the first time in several weeks, will probably drop below 50 per cent of ingot capacity this week, and among the independent companies the pulling off of some active steel making capacity has been fairly general. Among the finishing mills those engaged on tin plate are the most fully employed, closely followed by the pipe furnaces. American Sheet & Tin Plate Co. has every one of its tin plate plants running with close to 90 per cent of the hot mills in operation. There has been considerable falling away in sheet mill activities, and not enough business is developing to keep plate, structural and bar mills at all well employed. No change is noted in the number of active blast furnaces in this and nearby districts, 53 out of a total of 140 being in blast. It is probable that some furnaces will be banked during Christmas week and a low rate of operation of steel plants also is likely during that week.

The scrap market, temporarily at least, is firmer in the open-hearth grades, as a result of some recent purchases by some of the Steel Corporation subsidiaries. Activity still is lacking in coke and coal and prices remain easy. The pig iron market is showing a fair degree of activity in foundry iron, but no advance over recent prices.

Pig Iron.—A number of moderate sized lots of foundry iron both for prompt and early 1922 shipment have been closed in the past week, the demand coming chiefly from the radiator and sanitary ware manufacturers. Generally a price of $20.50 furnace has been maintained on No. 2 foundry, but there was one lot of 250 tons which moved at $20.25. A little No. 3 iron is included in the week's business, this grade selling at $20, furnace, and the same price ruled on a fair sized tonnage of standard malleable iron for shipment during the first six weeks of 1922. Bessemer iron holds at $20, Valley furnace, on such business as has recently been done, and there has been no business in this district to warrant any change in the Valley basis of basic iron. There have been no inquiries from consumers of basic iron to whom Valley iron could be

shipped, except in competition with furnaces having a much more favorable freight rate. The only inquiry of any size for this grade was one of 1000 tons from the Follansbee Bros. Co. Considerable comment is heard about the action of the Interstate Commerce Commission in rescinding the extension of the present rail-rates on ore from lower Lake docks after Jan. 1 to March 31. Interior furnaces have not been generally benefited by the October reduction since they previously had brought down about all the ore they required and now will be deprived of any help which the extension of the rate over the first quarter of the year would have meant. Lake furnace interests are blamed for this development because of their activity in trying to secure a cut in coal and coke freight rates. Valley furnace interests assert that the per mile rate on fuel to the Lake furnaces is relatively lower than that to the Valley districts.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.96 per gross ton:

Basic	$19.00
Bessemer	20.00
Gray forge	19.50
No. 2 foundry	20.50
No. 3 foundry	20.00
Malleable	20.00

Ferroalloys.—Not much interest is observed in this immediate territory in spiegeleisen, but inquiries for most of the other ferroalloys are better than they have been, with a number of consumers seeking to line up supplies of 50 per cent ferrosilicon for the first quarter of 1922. Actual business remains rather limited, but because of the increase in interest by consumers in the market, there is a slightly firmer tendency to prices. Both domestic and English makers of ferromanganese are quoting 80 per cent material at $58.35 c.i.f. Atlantic seaboard, or $63.37 delivered, Pittsburgh, common rate points. The last business done by Carnegie Steel Co. was on a basis of $60, Pittsburgh, but there is now some question whether it would accept any more business at that price. On 50 per cent ferrosilicon the negotiation price is $60, furnace, freight allowed, but while offerings of this material are moderate, it is probable that less will be accepted to start business going. We note the sale of one carload at $58 delivered, to a West Virginia steel company. Small sales of ferrochrome have been done on a basis of 16c. per lb. Pittsburgh, and small lots of ferrovanadium at $4.55 per lb. Pittsburgh.

We quote 78 to 82 per cent domestic ferromanganese at $60 to $63.67 delivered; 78 to 82 per cent foreign ferromanganese, $58.35, c.i.f. Atlantic seaboard; German, $54, seaboard. Average 20 per cent spiegeleisen at $30 delivered, Pittsburgh or Valleys; 50 per cent ferrosilicon, domestic, $58 to $60, freight allowed. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, $38.50; 11 per cent, $41.80; 12 per cent, $45.10; 13 per cent, $49.10; 14 per cent, $54.10; silvery iron, 6 per cent, $27; 7 per cent, $28; 8 per cent, $29.50; 9 per cent, $31.50; 10 per cent, $33.50; 11 per cent, $36; 12 per cent, $38.50. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is $4.06 per gross ton.

Billets, Sheet Bars and Slabs.—The market remains extremely inactive; indeed there is so little going on that prices are entirely nominal. Most makers of sheet bars have contracts for shipments over the remainder of the year, priced at $30, and are not inclined to consider a lower price. It is reported, however, that a Pittsburgh district sheet maker recently was able to secure a round tonnage at $28.50, Pittsburgh, but confirmation is lacking. There is practically no demand for billets or slabs and what the makers would quote against attractive business is entirely conjectural.

We quote 4 x 4 in. soft Bessemer and open-hearth billets at $28 to $30; 2 x 2 in. billets, $30; Bessemer and open-hearth sheet bars, $30; slabs, $30; forging billets, ordinary carbons, $32 to $35, all f.o.b. Youngstown or Pittsburgh mills.

Wire Rods.—The market is definitely back to a base of $38 Pittsburgh, for soft rods and that price is based on only small sales as current demands are extremely light. There is an impression that the prices of rods will be lower after the turn of the year, and for that reason consumers are not showing much interest in their early 1922 requirements. Prices are given on page 1572.

Steel Skelp.—Based on actual business, the market on steel pipe skelp no longer is quotable at above 1.50c. Pittsburgh, although the quotation against such inquiries as are coming out usually is 1.60c.

Structural Material.—Prices are irregular and easy, since only a moderate amount of new business is coming out, and there is considerable competition for part of it. On very small tonnages, 1.60c. still is being obtained, but on lots of 100 tons or more 1.50c. is the going price. Structural awards are seasonably few and small. The American Bridge Co. has been awarded the contract for the lock gates at Ohio River Dam Nos. 30 and 32, between Portsmouth and Cincinnati, which will take about 600 tons. The McClintic-Marshall Co. has taken 165 tons of stringers for the Brooklyn Bridge and the Jones & Laughlin Steel Co. will furnish 70 tons of bridge material for the Wayne County, Mich., Board of Road Commissioners. Other recent awards included 250 tons for an addition to the plant of Koppel Industrial Car & Equipment Co., Koppel, Pa., to the Pittsburgh Bridge & Iron Co., and one of 250 tons to the Riverside Bridge Co., Wheeling, W. Va. Plain material prices are given on page 1572.

Plates.—Inquiries are good because of a continued demand from the oil companies for storage tanks, but Pittsburgh and Valley mills are not getting much business, in competition with mills located in other centers. The minimum on plates here and at Valley mills is 1.50c., and some of them still are quoting $2 per ton above that price. Some ⅛-in. plates recently were taken by a Valley maker at 1.65c., base.

We quote sheared plates, ¼ in. and heavier, tank quality, at 1.50c. to 1.60c. f.o.b. Pittsburgh.

Iron and Steel Bars.—Competition between mills in different centers for a share in the very moderate amount of business is keeping prices in buyers' favor, and 1.50c. mill is a more common basis than 1.50c. Pittsburgh. High carbon or reinforcing bars are even weaker than mild bars because of the keen competition of makers for passing orders. As low as 1.45c., Pittsburgh, is reported to have been done recently. Alloy steel bars are firm at recent prices. Eastern mills are said to be offering common iron bars at 1.50c., delivered, Pittsburgh, but 2c. is the minimum price named by Pittsburgh district mills, this being on a bar which it is claimed is of better quality than those produced in the East.

We quote steel bars rolled from billets at 1.50c.; reinforcing bars, rolled from billets, 1.45c. to 1.50c. base; reinforcing bars, rolled from old rails, 1.40c. to 1.45c.; refined iron bars, 2c. to 2.10c. in carloads, f.o.b. mill, Pittsburgh.

Steel Rails.—Only scattering demands are coming out for light rails and there is so much eagerness for orders that the quotation of 1.60c. base for these rails rolled from new billets is largely an asking price. On such business as has been closed, the common price has been 1.55c. Light rails, rolled from old standard section, no longer are quotable at above 1.50c. base, mill.

We quote 25 to 45-lb. sections, rolled from new steel, 1.55c. to 1.60c. base; rolled from old rails, 1.50c. base; standard rails, $40 per gross ton mill for Bessemer and open-hearth sections.

Sheets.—Business steadily is dropping off, but there continues to be remarkably close adherence to the regular quotations. Buyers do not seem interested, and makers are not urging purchases. The American Sheet & Tin Plate Co. this week is operating about 60 per cent of its sheet mills. This is considerably above the independent rate, which does not exceed 40 per cent. Prices are given on page 1572.

Tin Plate.—The first tangible evidence of a non-observance of the regular market quotation of $4.75 per base box, Pittsburgh, for production plate, has come to light in the past week in the booking of a good sized order on a basis of $4.65. Since this price is acceptable to some makers, especially on contracts running over the first half of next year, it must be recognized as a quotation, and we revise our prices accordingly.

We quote standard production coke tin plate at $4.65 to $4.75 per base box f.o.b. Pittsburgh for carload lots.

Wire Products.—Current demands still are for small lots sufficient to meet the immediate needs of buyers. Some inquiries still are coming out for first quarter tonnages, but actual business is small and specifica-

tions against orders already in are difficult to secure. The drive for business a few weeks ago, on the basis of a possible advance in prices and the failure of the advance to materialize, have made buyers cautious and also created an impression that even lower prices are likely before spring. Pittsburgh district mills are running into lower prices in some consuming districts from mills having a freight advantage on delivery over them.

We quote wire nails at $2.75 base per keg, Pittsburgh, and bright basic and Bessemer wire at $2.50 base per 100 lb., Pittsburgh.

Hot-Rolled and Cold-Rolled Strips.—The approach of the end of the year is resulting in an increased tendency on the part of consumers to keep down their purchases. There is no special change in prices, with makers generally asking 2.25c. base on hot-rolled and 4c. base on cold-rolled, but not much actual business is being placed at higher than 2c. and 3.75c. respectively, and instances are not lacking in which even these prices are being shaded.

Coke and Coal.—Business is almost at a standstill in coke and prices are rather indeterminate. On standard 48-hr. fuel the spot market appears to be about $2.75 per net ton at oven on fresh production, but sales of loaded cars are reported to have been done as low as $2.50. Those shipping on contracts, on the other hand, claim that they are obtaining a net price of $3.40. One or two inquiries have come out for first quarter tonnages from furnaces now being supplied from a steel works by-product plant, but the common belief is that the present supply arrangements will be extended. Beehive oven operators are talking anywhere from $3.25 to $3.75 against first quarter business, but probably would accept less against an actual order. Foundry coke is easier and while $4.50 per net ton oven still is being obtained on choice brands, the more common range is from $3.75 to $4. The coal market is inactive and unsettled, with steam coal available as low as $1.50 for non-union mine run grade and this is all that is to be considered since the non-union fields are well able to take care of current demands. Mine run by-product coal is quotable from $1.60 to $1.85, and the same grade of gas coal from $2 to $2.35.

Iron and Steel Pipe.—Although lacking in spectacular sales, the market in both steel and wrought iron pipe still is relatively active and the close proximity of the end of the year has not yet brought any material slowing up in shipping orders. There is better observance of the card discounts on merchant pipe than on oil country goods and line pipe, although lately there has been a slight firming up in prices of the last-named product. The spread between prices of merchant and line pipe still is unusually wide and the belief is fairly common that either line pipe must advance or merchant pipe come down, in the stabilization of the market. It is reported that the Tidewater Oil Co., which recently put out an inquiry for 150 miles of 6-in pipe, has scaled it down to about 10 miles and instead of constructing a line will put up a number of storage tanks. Discounts are given on page 1572.

Boiler Tubes.—Outside of moderate buying by the railroads incidental to locomotive repairs, the market is entirely lacking in activity and prices continue very irregular with the advantage in favor of buyers. Discounts are given on page 1572.

Cold-Finished Steel Bars and Shafting.—Almost no demand is developing for shafting and orders for screw stock generally are for small lots, although fairly frequent and usually, immediate delivery is wanted. Prices hold within the recent range of from 2c. to 2.25c. base, Pittsburgh, but the bulk of the orders is being placed at from 2.15c. down to 2c., and the higher figure refers entirely to retail quantities. Ground shafting is unchanged at $2.50 base, mills, for carloads.

Hoops and Bands.—Current demands are extremely light and there is very little interest on the part of consumers in tonnages for the early part of next year. The official quotation on both products is 2.25c. base, but on new business 2.15c. is maximum, and on orders at all desirable, buyers rarely have to go above 2c. base.

Nuts and Bolts.—It it impossible to chronicle any improvement in business as far as makers in this district are concerned. The railroads are practically out of the market at present and such demands as are coming out from other sources are entirely for small lots. Makers here claim to be adhering firmly to quotations, although this attitude is costing them the loss of some business. Discounts are given on page 1572.

Rivets.—Activity still is lacking, although makers are getting a fair number of small orders for quick delivery. On carload lots, the going prices are $2.25 base for large structural and ship rivets and $2.35 base for large boiler rivets. These prices, however, are not being done on less than carload lots, on which makers are holding firmly at $2.40 and $2.50. Prices and discounts given on page 1572.

Spikes.—The market is seasonably dull with very little interest being observed either by the railroads or jobbers. The market is quoted at $2.25 base per 100-lb. for large spikes and $2.40 base per 100-lb. for the smaller sizes, but mills outside the Pittsburgh district are reported to have taken the equivalent of $2.35 Pittsburgh on small spikes and less than $2.25 probably could be done on large spikes. Prices are given on page 1572.

Old Material.—Some fair sized purchases recently by several of the subsidiary companies of the Steel Corporation have temporarily, at least, checked the downward trend of prices and given some firmness to the market in the heavier grades of open-hearth material. Purchases by these companies have been of the better grades of railroad material and the delivered price has been $15.50 and in one or two instances slightly more. On strictly heavy melting grade only small lots of say, a carload or two, are available as low as $14. On lots of 1000 tons or more, no sales have been done recently at less than $14.25 and there are few dealers who will take on a tonnage at $15. On light material, such as turnings, the market is dull and inclined lower. The general market, however, is rather firm, because offerings are moderate from producing sources and present prices are too low to tempt dealers to offer yard material.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate, as follows:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh	$14.00 to $14.50
No. 1 cast, cupola size	16.00 to 16.50
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.	15.50 to 16.00
Compressed sheet steel	11.50 to 12.00
Bundled sheets, sides and ends	10.50 to 11.00
Railroad knuckles and couplers	15.00 to 15.50
Railroad coil and leaf springs	15.00 to 15.50
Low phosphorus standard bloom and billet ends	18.00 to 19.00
Low phosphorus plates and other grades	17.00 to 17.50
Railroad malleable	13.00 to 13.50
Iron car axles	25.00 to 26.00
Locomotive axles, steel	23.00 to 24.00
Steel car axles	15.50 to 16.00
Cast iron wheels	15.00 to 15.50
Rolled steel wheels	14.50 to 15.00
Machine shop turnings	9.00 to 9.50
Sheet bar crop ends	14.00 to 14.50
Heavy steel axle turnings	11.00 to 11.50
Short shoveling turnings	10.00 to 10.50
Heavy breakable cast	14.00 to 14.50
Stove plate	13.00 to 13.50
Cast iron borings	9.50 to 10.00
No. 1 railroad wrought	11.50 to 12.00

Plans are being completed by the Youngstown Welding Co., 536 West Rayen Avenue, Youngstown, Ohio, for construction of a new plant on a site of three and one-half acres along the Youngstown & Austintown Railroad. The company's new capacity will be devoted to welded metal products, principally truck and storage tanks. It proposes to specialize in truck tanks, elliptical and rectangular, built in all standard sizes and capacities. According to present plans, the initial unit of the plant will consist of a building 100 x 200 ft., others to be added later as the business warrants. The company's present property will be continued in operation. Walter D. McKay is president of the concern.

Chicago

CHICAGO, Dec. 13.

The market is generally quiet as the end of the year approaches and is entirely devoid of spectacular features. The attitude of buyers is characterized by extreme caution for which various explanations are offered. The desire to keep inventories at a minimum so that the final balance sheet of the year may look as favorable as possible from the standpoint of the banks is believed to be one motive for restricted purchases, particularly by those who will find it necessary to borrow in the near future. The cancellation of the war tax on freight effective Jan. 1 may also be a factor influencing the attitude of consumers and it is not unlikely that the necessity of gathering funds to pay the last installment of the 1920 taxes due this week has tended to accentuate the conservatism already marked.

Of less immediate import but nevertheless of far-reaching effect on the program of purchasing departments is the feeling that liquidation in transportation charges has not yet begun, and that further cuts in railroad labor costs must be made so that lower rates on the movement of ore, coal, pig iron and finished material can be put into effect. The testimony of Messrs. Topping, Dinkey and others in the Interstate Commerce Commission hearing on ore rates brought out in bold relief the sharp liquidation which has taken place in iron and steel products in contrast with practical immobility of railroad rates and wages.

Notwithstanding the slackening aspect of the market, it is notable that mills and furnaces have not lost any of the gains they have made over the low-operating records of August. This is probably accounted for by heavy specifications which are now being received from railroad carbuilders and oil storage tank fabricators. One local mill, in fact, reports bookings of 20,000 tons of plates, shapes and bars during the past week. The Illinois Steel Co. continues to operate 11 blast furnaces and is producing steel at the rate of 45 per cent of ingot capacity. The Inland Steel Co.'s operations have improved, being at the rate of over 50 per cent of ingot capacity. This producer has 10 open hearths active and most of its mills running.

Perhaps the main source of better sentiment in the trade is to be found in the increasing prospects of a successful outcome of the Arms Conference. The rapid rise of sterling exchange which has accompanied the progress of deliberations at Washington is welcomed as an important step in the direction of conditions which will tend to remove present obstacles to export business. The depressing picture of the economic situation in Europe recently drawn by certain publicists of great prominence is now regarded as a gross exaggeration.

Pig Iron.—The Federal furnace recently blown in is now producing iron, so that there are now three merchant stacks in operation which were idle only a few weeks ago. While consumption is slowly growing in volume, as evidenced by increased production, the market still has a quiet aspect and is lacking in interesting features. Prices appear to be fairly firm at $20, base, local furnace, for foundry, malleable and basic, although some resale material has been offered at concessions and some furnace tonnage also has moved at a slightly lower figure. The St. Paul Railroad has bought 500 tons of malleable for its Milwaukee shops at a reported price of $20.50, delivered. This represents a slight concession in freight when figured back to a Chicago furnace basis, as the rate from here to Milwaukee is 84c. Current inquiries include one from a western Michigan melter for 1000 tons of malleable, a second from a Chicago railroad equipment manufacturer for 500 tons of foundry, and a third from a western Illinois jobbing foundry for 300 tons of foundry, all calling for first quarter delivery. Inquiries for 200 tons of foundry and several carload lots have been received from the Twin Cities and adjacent points in Minnesota. A sale of 400 tons of Southern foundry at $17.50, base Birmingham, has been made at a point in Indiana where the freight disadvantage of Southern producers is not so decided as in Chicago. A carload sale at the same price is also reported. A local railroad equipment manufacturer has bought 400 tons of 14 per cent Bessemer ferrosilicon. Some charcoal is said to have been sold at slight concessions under the ruling price of $28, base furnace. An inquiry for two carloads of 8 per cent silvery is before the trade. A recent survey of foundry operations in this territory showed the following averages: Agricultural implement manufacturers, 10 per cent of normal; makers of building supplies, 50 per cent; manufacturers of heating equipment, 34 per cent; jobbing foundries, 17 per cent; malleable plants, 18 per cent; automotive foundries, 20 to 30 per cent; ornamental and structural iron and steel manufacturers, 34 per cent; steel jobbing foundries, 34 per cent; railroad equipment manufacturers, 75 per cent.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include a switching charge averaging 70c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$31.50
Northern coke, No. 1, sil. 2.25 to 2.75	20.50
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	20.00
Northern high phos.	20.00
Southern foundry, sil. 1.75 to 2.25	24.17
Malleable, not over 2.25 sil.	20.00
Basic	21.00
Low phos., Birmingham	32.00
Low phos., Valley furnace, sil. 1 to 2 per cent copper free	33.00
Silvery, sil. 8 per cent	32.02

Ferroalloys.—Outside of an inquiry for two carloads of 16 per cent spiegeleisen and two carloads of 50 per cent ferrosilicon, the market is without features.

We quote 78 to 82 per cent ferromanganese, $66.75, delivered; 50 per cent ferrosilicon, $60, delivered; spiegeleisen, 18 to 22 per cent, $36 to $37, delivered.

Railroad Equipment.—The Northern Pacific has awarded 1200 center constructions for freight cars requiring 2000 tons of steel, to the Western Steel Car & Foundry Co. The Pere Marquette, which last week let 1000 steel underframe box cars with an option on 1000 additional to the same car builder, has cut its order in half. The Union Pacific has let repairs on 500 freight cars to the Pacific Car & Foundry Co. The Central Railroad of New Jersey is in the market for 25 mikado type locomotives.

Rails and Track Supplies.—Both of the local rail producers received part of the New York Central rail order. The Illinois Steel Co. will roll from 35,000 to 40,000 tons, depending on whether the road takes up its option on additional tonnage, while the Inland Steel Co. will supply from 8000 to 9000 tons. The Illinois Central contemplates placing from 20,000 to 30,000 tons for its 1922 requirements. The plans of other Western lines are still in the formative stage. It is interesting to note that those roads which have been accustomed to give part of their tonnage to the Colorado mill will have to pay the old price of $47 for open-hearth rails, as that producer has not yet followed the reductions of other mills. There is little activity in track materials, but tie plates are unsteady and are available at from 1.90c. to 2c.

Standard Bessemer and open-hearth rails, $40; light rails rolled from new steel, 1.70c. to 1.75c. f.o.b. makers' mills.

Standard railroad spikes, 2.20c. to 2.25c., Pittsburgh; track bolts with square nuts, 3.20c. to 3.25c., Pittsburgh; tie plates, steel and iron, 1.90c. to 2c., f.o.b. mill; angle bars, 2.40c., f.o.b. mill.

Bars.—Business in soft steel bars remains light with the price situation unchanged. There have been few lettings of reinforcing work, although there are a number of attractive jobs in prospect. The Corrugated Bar Co. will furnish about 100 tons for a 30-apartment building at 6 Prospect Avenue, Milwaukee. Bids have been taken on a vocational school at St. Paul requiring 200 tons and figures will be taken on the Bryant School, Minneapolis, involving 470 tons, on Dec. 15. Another Minneapolis project on which bids will soon be taken is the Lincoln School requiring 500 tons. The Arnold Co. engineer, Chicago, is taking figures on 200 tons for the Standard Dry Goods Co. building, Huntington, W. Va. Considerable reinforcing work is expected to develop after the first of the year. In Iowa the individual counties will contract for their requirements in steel for highway purposes, which will aggregate 5000 or 6000 tons, if as large as those of this year. Demand for bar iron is still spasmodic and insufficient in volume to warrant continuous mill operations. One bar iron mill which has been idle for 12 days is resuming oper-

ation this week, while another important mill remains inactive. Outside of an order from one of the leading railroads for 500 tons, little new business is reported. Prices appear to be steady at 1.65c., Chicago. The situation on the hard steel bars is similar, with going prices at 1.65c., Chicago.

Mill prices are: Mild steel bars, 1.60c. to 1.75c., Chicago; common bar iron, 1.65c., Chicago; rail carbon, 1.65c., mill or Chicago.

Jobbers quote 2.68c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 3.55c. for rounds and 4.05c. for flats, squares and hexagons. Jobbers quote hard and medium deformed steel bars at 2.38c. base. Hoops and bands, 3.28c.

Wire Products.—In the absence of active demand, the market has weakened and prices have dropped back to the levels effective before the advance of Sept. 12; namely, $2.75 base per keg on wire nails and $2.50 on plain wire. Cement coated nails are now rather commonly quoted at $2.25 to $2.35, while as low as $2.20 has been reported. Railroad buying is the only promising feature in the market.

We quote warehouse prices f.o.b. Chicago; No. 9 and heavier black annealed wire, $3.48 per 100 lb.; No. 9 and heavier bright basic wire, $3.63 per 100 lb.; common wire nails, $3.65 per 100 lb.; cement coated nails, $3.05 per keg.

Sheets.—Buyers continue to delay buying, but prices appear to be firm at the figures quoted below. The local independent still has a substantial backlog which will probably sustain capacity operations until the end of the year.

Mill quotations are 3c. for No. 28 black, 2.25c. for No. 10 blue annealed and 4c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight to Chicago of 38c. per 100 lb.

Jobbers quote: Chicago delivery out of stocks, No. 10 blue annealed, 3.38c.; No. 28 black, 4.15c.; No. 28 galvanized, 5.15c.

Plates.—Mills are fairly busy on orders for car and tank steel recently placed. Specifications from car builders are gradually being received, one local producer having received rolling instructions on 5000 tons during the past week. Business from other sources is still light. The price situation remains substantially unchanged.

The ruling mill quotations range from 1.60c. to 1.75c. Chicago. Jobbers quote 2.78c. for plates out of stock.

Bolts and Nuts.—Except for railroad inquiries which are bringing out low quotations, there is little activity in the market. Discounts are generally unsteady and in some cases quotations are being made f.o.b. Chicago. For mill prices, see finished iron and steel, f.o.b. Pittsburgh, page 1572.

Jobbers quote structural rivets, 3.43c.; boiler rivets, 3.53c.; machine bolts up to ⅞ x 4 in., 60, 10 and 10 per cent off; larger sizes, 60 and 10 off; carriage bolts up to ⅞ x 6 in., 60 and 10 off; larger sizes, 55 and 5 off; hot pressed nuts, square and hexagon tapped, $3.75 off; blank nuts, $4 off; coach or lag screws gimlet points square heads 65 and 5 per cent off. Quantity extras are unchanged.

Cast Iron Pipe.—Buying is light, as is usual at this time of the year, but there are still a number of large tonnages unclosed which, if let this month, will bring up December sales to a respectable level. One of these is 1000 tons for the Baldwin Reservoir, Cleveland. James B. Clow & Sons was the successful bidder on 450 tons for Galesburgh, Ill., and the United States Cast Iron Pipe & Foundry Co. has taken 200 tons for Canton, Ohio. The National Cast Iron Pipe Co. will furnish 250 tons for Flushing, Mich. Five hundred tons for Broadview, Ill., is pending.

We quote per net ton, f.o.b. Chicago, ex-war tax, as follows: Water pipe, 4-in., $47.10 to $48.10; 6-in. and above, $43.10 to $44.10; class A and gas pipe, $4 extra.

Warehouse Business.—As the end of the year approaches, the general dullness increases. But little business is reported, and judging the month by the first two weeks, it will probably make the poorest showing of any month this year. Although prices are generally unchanged, there is a tendency among small dealers to shade prevailing quotations, in the case of steel bars ignoring the differential on sizes, either partially or entirely. Sheets are unchanged at 3.28c. per lb. base for blue annealed; 4c. per lb. base for black and about 4.85c. per lb. base for galvanized, with small lots of a 100 lb. or less selling at slightly higher figures. Charcoal tin plate is off about 25c. per box. The brass and copper market shows no change and reports business dull. Dealers in wrought iron and steel pipe see but little prospect of improved business before February or March, but anticipate some change in prices early in the coming year. We quote prices on page 1588.

High-Speed Steel.—The market continues dull, with the average price for 18 per cent tungsten high-speed steel 90c. per lb. and special grades ranging up to $1.05 per lb.

Structural Material.—Although the week's list of fabricating awards is the longest reported for some time, this is regarded as a temporary turn for the better in a dull market. Keen competition among both mills and fabricators is still the rule and much more construction work must make its appearance before any material change in the situation will be effected. Prices of plain material still lack stability, but are on about the same level as heretofore. Fabricating awards include:

Kennedy Sales Co. Building, Kansas City, 100 tons, to Kansas City Structural Steel Co.

Webber's Falls bridge and St. Louis-San Francisco bridge, Muskogee County, Okla., 1574 tons, to Vincennes Bridge Co.

Kansas, Oklahoma & Gulf Railroad bridge, Muskogee County, Okla., 473 tons, to Pan-American Bridge Co., New Castle, Ind.

Whitefield bridge, Haskell County, Okla., 469 tons, to Virginia Bridge & Iron Co.

Illinois Life Insurance Building, Chicago, 462 tons, to Union Foundry Co.

Polar Wave Ice & Fuel Co., Victor Plant, St. Louis, 264 tons, to American Bridge Co.

Northern Illinois Fair and Exposition, grandstand roof, Aurora, Ill., 130 tons, to Union Foundry Co.

Glen Oaks School, Peoria, Ill., 100 tons, to Decatur Bridge Co.

Cananea Consolidated Copper Co., plant additions, Cananea, Mex., 275 tons, to Worden-Allen Co.

Coal tipple, Eagle Pass, Tex., 150 tons, to Worden-Allen Co.

United States Gypsum Co., panel board plant, Southard, Okla., 175 tons, to Worden-Allen Co.

East wing addition to Sheridan Plaza Hotel, Chicago, 441 tons, reinforced concrete substituted for structural steel.

Pending business includes:

Power house for city of Lansing, Mich., 700 tons, bids being taken by Woodwell & Resler, engineers, Lansing.

J. L. Taylor Co., building, Chicago, 1000 tons, revised bids asked by George A. Fuller Co.

Y. W. C. A. Building, Dallas, Tex., 400 tons.

Medical Arts Building, Dallas, 2000 tons.

The mill quotation on plain material ranges from 1.65c. to 1.75c., Chicago. Jobbers quote 2.78c. for materials out of warehouse.

Old Material.—A local steel mill has placed a number of small orders for heavy melting and allied grades at prices ranging from $11 to $11.50 per gross ton delivered. With this exception there has been no consumptive buying of consequence and prices are generally weaker, a number of grades having definitely dropped 50c. a ton. Railroad offers are light. The Soo Line has issued two lists, one of 700 tons and the other of 470 tons.

We quote delivery in consumers' yards Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	$16.50 to $17.00
Relaying rails	23.00 to 27.50
Cast iron car wheels	16.00 to 16.50
Rolled or forged steel car wheels	13.50 to 14.00
Steel rails, rerolling	12.50 to 13.00
Steel rails, less than 3 ft	12.50 to 13.00
Heavy melting steel	11.00 to 11.50
Frogs, switches and guards cut apart	11.00 to 11.50
Shoveling steel	10.50 to 11.00
Low phos. heavy melting steel	13.50 to 14.00
Drop forge flashings	8.00 to 8.50
Hydraulic compressed sheet	8.50 to 9.00
Axle turnings	8.50 to 9.00
Per Net Ton	
Iron angles and splice bars	14.00 to 14.50
Steel angle bars	11.00 to 11.50
Iron arch bars and transoms	15.00 to 15.50
Iron car axles	19.50 to 20.00
Steel car axles	13.00 to 13.50
No. 1 busheling	8.00 to 8.50
No. 2 busheling	6.25 to 6.75
Cut forge	10.50 to 11.00
Pipes and flues	6.50 to 7.00
No. 1 railroad wrought	10.50 to 11.00
No. 2 railroad wrought	10.50 to 11.00
Steel knuckles and couplers	11.50 to 12.00
Coil springs	12.50 to 13.00
No. 1 machinery cast	12.50 to 13.00
No. 1 railroad cast	12.00 to 12.50
Low phos. punchings	11.00 to 11.50
Locomotive tires, smooth	10.00 to 10.50
Machine shop turnings	3.50 to 4.00
Cast borings	5.50 to 6.00
Stove plate	12.00 to 12.50
Grate bars	10.50 to 11.00
Brake shoes	11.00 to 11.50
Railroad malleable	11.50 to 12.00
Agricultural malleable	11.50 to 12.00

Philadelphia

PHILADELPHIA, Dec. 13.

Marked weakness in foundry pig iron has developed within the past week and prices as low as $19.30, furnace, for No. 2 plain iron have been made on a large tonnage for a New England interest. On smaller lots, $20, furnace, has been quoted for No. 2 plain, $21 for No. 2X and $22 for No. 1X, but some furnaces are asking prices at least 50c. per ton above these.

In steel products there is very little of interest. The mills are making an effort to run up until Christmas, at which time there will probably be a general shutdown until after New Year's.

Pig Iron.—In sharp competition for the foundry iron orders placed by the H. B. Smith Co., Westfield, Mass., amounting to 7500 tons, there was cutting of prices by eastern Pennsylvania furnaces, one of which took an order for 3000 tons and the other an order for 1500 tons at $23.36, delivered Westfield, for No. 2 plain iron, which works back to $19.30, furnace. A New York State furnace, which also was awarded a 3000-ton order, set the pace by quoting on a basis of $17.90, Buffalo, or $23.36, delivered, and the furnaces in this district met this quotation on their share of the business. The Sessions Foundry Co., Bristol, Conn., has also bought 2000 tons, according to report, but whether this business came to a furnace in this district is not known here. A pipe company has bought 2000 tons of No. 2 plain iron for early delivery. There have been other smaller purchases and a considerable tonnage, possibly 10,000 tons or more, is still pending. For shipment to points in eastern Pennsylvania it is not apparent that furnaces represented here would go below $20, furnace, for No. 2 plain, $21 for No. 2X and $22 for No. 1X, but these prices have been quoted on inquiries received within the past week. Gray forge iron is obtainable at $20, furnace, malleable at $22, furnace, standard low phosphorus at $36.50, furnace, and copper bearing low phosphorus at $35, furnace, but in all of these grades there is no activity worth mentioning.

The following quotations are, with the exception of those on low phosphorus iron for delivery at Philadelphia, and include freight rates varying from 84 cents to $1.54 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$21.26 to $21.76
East. Pa. No. 2X, 2.25 to 2.75 sil.	22.26 to 22.76
Virginia No. 2 plain, 1.75 to 2.25 sil.	27.74 to 28.74
Virginia No. 2X, 2.25 to 2.75 sil.	28.24 to 29.74
Basic deliv. eastern Pa.	21.00 to 21.50
Gray forge	22.25 to 23.00
Malleable	24.00 to 25.00
Standard low phos. (f.o.b. furnace)	36.50
Copper bearing low phos. (f.o.b. furnace)	35.00

Ferroalloys.—Domestic producers of ferromanganese and British selling agents continue to quote $58.35, seaboard. Lower prices are being made in the Pittsburgh district by the Steel Corporation. Spiegeleisen is not in demand and is quoted at $25 to $27, furnace.

Billets.—There is very little inquiry for billets, which are quoted at $29, Pittsburgh, for rerolling quality, and at $33 to $34, Pittsburgh, for forging quality.

Rails.—The Norfolk & Western Railroad, which recently opened bids on 40,000 tons of heavy rails for 1922 delivery, has divided this tonnage among three makers. The Bethlehem Steel Co. was awarded close to 25,000 tons and the remainder was divided between the Steel Corporation and the Cambria Steel Co.

Plates.—The order for 10,000 tons of plates to be fabricated into pipe for the New York City aqueduct by the Merchant Shipbuilding Co., Chester, Pa., was divided about equally between the Bethlehem Steel Co. and the Midvale Steel & Ordnance Co. Aside from these contracts, which involve deliveries running throughout the next year, there has been no plate business of importance taken by Eastern mills. Plates are nominally quoted at 1.50c., Pittsburgh, but it continues fairly easy to shade this price on desirable tonnage.

Structural Material.—A number of projects involving a few hundred tons of steel each are pending in this district, but on the whole the market is very quiet, and there is no change in price. Plain material is quoted at 1.50c., Pittsburgh, but this is occasionally shaded.

Bars.—Steel bars appear fairly firm at 1.50c., Pittsburgh, despite reports of shading $1 a ton. Jobbers are buying very little this month, being mostly concerned with reduction of inventories. Bar iron is quoted at 1.60c., Pittsburgh, but buyers are taking so little interest that the price is not being tested.

Sheets.—Two small eastern Pennsylvania mills are reported to be shading prices on sheets, but the larger mills are adhering to 2.25c. on blue annealed, 3c. on black and 4c. on galvanized, base Pittsburgh. Business is very light.

Warehouse Business.—Bar iron has been advanced to 2.65c. by local jobbers to put it on the same level as steel bars. Local jobbers quote as follows for Philadelphia delivery:

Soft steel bars and small shapes, 2.65c.; iron bars (except bands), 2.65c.; round edge iron, 2.80c.; round edge steel, iron finish, 1½ x ½ in., 2.95c.; round edge steel planished, 3.70c.; tank steel plates, ¼-in. and heavier, 2.75c.; tank steel plates, 3/16-in., 2.925c.; blue annealed steel sheets, No. 10 gage, 3.50c.; light black sheets, No. 28 gage, 4c.; galvanized sheets, No. 28 gage, 5c.; square twisted and deformed steel bars, 2.65c.; structural shapes, 2.60c.; diamond pattern plates, ¼-in., 4.60c.; 3/16-in., 4.785c.; ⅛-in., 4.90c.; spring steel, 4.10c.; round cold-rolled steel, 3.25c.; squares and hexagons, cold-rolled steel, 3.75c.; steel hoops, No. 13 gage and lighter, 3.50c.; steel bands, No. 12 gage to 3/16-in., inclusive, 3.25c.; iron bands, 3.90c.; rails, 2.75c.; tool steel, 8c.; Norway iron, 5c.; toe steel, 4.50c.

Coke.—Furnace coke contracts for first quarter have been made at $3.30 to $3.40, Connellsville. Foundry coke is quoted at $4 to $4.50, Connellsville, according to quality.

Old Material.—Consumers of scrap are buying very little material and in some instances are trying to cancel contracts. Prices are weak and largely nominal. We note lower figures on several grades. Quotations for delivery to consumers in this district are as follows:

No. 1 heavy melting steel	$11.50 to $12.50
Scrap rail	11.50 to 12.50
Steel rails, rerolling	16.25 to 16.75
No. 1 low phos., heavy 0.04 and under	17.00 to 18.00
Car wheels	16.50 to 17.00
No. 1 railroad wrought	14.50 to 15.00
No. 1 yard wrought	12.00 to 12.50
No. 1 forge fire	9.50 to 10.00
Bundled sheets (for steel works)	9.50 to 10.00
No. 1 busheling	12.00 to 13.00
No. 2 busheling	10.00 to 11.00
Turnings (short shoveling grade for blast furnace use)	9.00 to 9.50
Mixed borings and turnings (for blast furnace use)	9.00 to 9.50
Machine-shop turnings (for rolling mill and steel works use)	9.00 to 9.50
Heavy axle turnings (or equivalent)	9.50 to 10.00
Cast borings (for steel works and rolling mills)	11.50 to 12.00
Cast borings (for chemical plants)	13.50 to 14.00
No. 1 cast	16.50 to 17.00
Railroad grate bars	13.50 to 14.00
Stove plate (for steel plant use)	13.50 to 14.00
Railroad malleable	13.50 to 14.00
Wrought iron and soft steel pipes and tubes (new specifications)	12.00 to 12.50
Iron car axles	No market
Steel car axles	17.00 to 18.00

Cleveland

CLEVELAND, Dec. 13.

Iron Ore.—A further wage reduction of 10 per cent is being considered by independent ore mine operators in the Lake Superior district. With four reductions previously made this year, wages of miners employed by the leading independent mining companies are still 63.44 per cent higher than in 1915. This percentage is based on the wage scales of independent companies in the Gogebic range, but wages in other districts have declined in about the same proportion. However, there is at present considerable irregularity in miners' wage scales. During the year, 52,145 tons of ore was shipped from the Michipicoten, Ontario, district which was not included in the total shipments from American ports. With this Canadian ore, the total lake shipments are 22,352,871 gross tons. All rail shipments for the year will amount to between 400,000 and 425,000 tons. The amount of ore on Lake Erie docks at the close of the season of navigation, Dec. 1, was nearly 2,000,000 tons less than on the same date a year ago. The amount on Dec. 1 was 9,032,595 tons as compared with 10,955,868 tons on the same date last year. Ore receipts at Lake Erie ports during the season were 15,554,341 tons as compared with 44,224,263 tons last year. Shipments from Lake Erie ports during the season were 12,195,679 tons as compared with 32,016,654 tons for the previous 12 months. Receipts at lake front furnaces located at Lake Erie ports were 2,712,433 tons for the season as

compared with 9,132,175 tons for 1920. Receipts at other than Lake Erie ports for the season were 6,560,139 tons as compared with 13,091,384 tons for the previous 12 months. Receipts at these ports for the season were as follows: Detroit, 253,458 tons; Indiana Harbor, 779,478 tons; Gary, 2,350,580 tons; South Chicago, 2,655,114 tons, including 21,435 tons shipped to the St. Louis district; Milwaukee, 20,552 tons; East Jordan, 10,892 tons; Sault Ste Marie, Ontario, 315,874 tons; Point Edward, Ontario, 174,191 tons.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, $6.45; Old range non-Bessemer, 51½ per cent iron, $5.70; Mesabi Bessemer, 55 per cent iron, $6.20; Mesabi non-Bessemer, 51½ per cent iron, $5.55.

Pig Iron.—There is some activity in foundry iron, but the demand is almost wholly outside of this immediate territory. The market is not firm and various reports of concessions in the outlying districts have made the price situation very uncertain. To the East, quotations of $18.50 are reported on Buffalo foundry iron at Erie and from the western part of the territory there are reports of low prices either from brokers or on resale iron, some of the latter having come on the market recently. While lake furnaces generally quote $20 as a minimum price on foundry iron, some orders have been taken at $19.50. There is a disposition to name a price that will take the order, the quotation depending on the tonnage required and delivery point. One lake furnace reports sales during the week aggregating 3200 tons, all in small lots, the largest order being for 250 tons. Some of these orders were for deliveries extending through the first quarter. A local interest sold 1000 tons for shipment to western Pennsylvania on the basis of $20 Valley. If this iron is shipped from Cleveland, it will mean a furnace price of about $19.10. Furnaces in the Valley appear to be holding to $20.50 for foundry iron for shipment to Valley points. Two inquiries for basic iron came out during the week, one from the Trumbull Steel Co. for 3000 to 4000 tons of iron and the other from the Follansbee Bros. Co. for 1000 tons.

Quotations below are f.o.b. local furnace for Northern foundry iron, not including a 56c. switching charge. Other quotations are delivered Cleveland, being based on a $1.96 freight rate from Valley points, a $3.36 rate from Jackson and a $6.67 rate from Birmingham:

Basic	$20.96
Northern No. 2 fdy., sil. 1.75 to 2.25	$19.50 to 20.00
Southern fdy., sil. 2.25 to 2.75	25.17
Ohio silvery, sil. 8 per cent	32.86
Standard low phos., Valley furnace	34.00 to 35.00

Finished Iron and Steel.—Mills are getting a fair volume of small orders, but the aggregate tonnage is light. Consumers are reducing their stocks to a minimum and are buying only what they actually need. The price situation shows virtually no change. On steel bars, plates and structural material 1.50c. is the minimum quotation for desirable orders, and the usual price range is up to 1.60c. However, local mills are holding to 1.75c. for plates unless the material specified carries good extras. Oil tank and car work are helping the plate and structural material demand materially. An additional 900 tons of tank plates has been placed by a lake shipyard for repair work. Tank shops are figuring on oil tank work for the Southwest and Mexico involving large plate tonnages. Reports from the Texas oil fields state that German plates are being offered at 2.08c., delivered at Port Arthur, Tex., or equivalent to 1.135c., Pittsburgh. On the inquiry for 3000 tons for steel re-inforcing bars for the Baldwin Reservoir, Cleveland, all mill quotations were 1.50c., Pittsburgh, and the contractor is trying to get a 1.35c. price. A Cleveland automobile part manufacturer has placed 500 tons of spring steel and a Canton consumer is inquiring for 400 tons of strip steel. The structural outlook has improved and considerable work is expected to come out early in the year. The Berger Iron Works, Akron, has taken 500 tons of steel for a foundry for the National Sulphur Co., Akron. The American Bridge Co. has taken a subcontract for fabricating steel for car repair work for the Wheeling & Lake Erie Railroad, requiring 800 tons. The Osborne Engineering Co., Cleveland, has asked for bids for 2500 tons of structural steel for a grandstand for the American League baseball grounds, New York. The approval by the Interstate Commerce Commission of the public square site for the union depot, Cleveland, is expected to lead to a start on that long delayed project, but the railroads do not expect to come out for any steel requirements for at least six months. There is still considerable irregularity on hoops and bands, a 1.75c. quotation appearing on the wider sections, but sales are being made up to 2.25c.

Jobbers quote steel bars, 2.54c.; plates and structural shapes, 2.64c.; No. 9 galvanized wire, 3.50c.; No. 9 annealed wire, 3.25c.; No. 28 black sheets, 3.75c.; No. 28 galvanized sheets, 4.75c.; No. 10 blue annealed sheets, 3.10c.; hoops and bands, 3.14c.; cold-rolled rounds, 3.85c.; flats, squares and hexagons, 4.35c.

Sheets.—Some consumers are trying to place first quarter contracts at lower than the regular price of 3c. for black, 4c. for galvanized and 2.25c. for blue annealed sheets, but mills are apparently holding firmly to these prices. Consumers' requirements for the remainder of the year are well supplied and sales are unusually light. Some of the leading independent sheet mills have adopted a new form of irrevocable contract under the terms of which the buyers will be obligated to take the quantity named at the contract price.

Alloy Steels.—Prices on chrome vanadium steel have stiffened. One mill has advanced its price from 3.90c. to 4.75c. per lb., Pittsburgh, and another maker is now quoting this steel at 5.25c., an advance of 0.25c. per lb.

Warehouse Business.—Local jobbing houses report an improvement in warehouse business in some lines over November, but sheets are quieter. Prices are holding fairly firm.

Bolts, Nuts and Rivets.—Some of the bolt and nut manufacturers report an improvement in the number of orders, but orders are all for very small lots. The price situation shows no change. The demand for rivets improved somewhat during the week. A few orders ranging from car lots up to 100 tons have come in from tank and car shops. These orders were placed at the regular price of 2.40c. for structural and 2.50c. for boiler rivets, but some makers continue to shade these prices from $1 to $3 a ton.

Coke.—The market is very dull. Price quotations on standard Connellsville foundry coke range from $4 to $4.75 per ton.

Old Material.—The market has again quieted down after recent purchases by dealers to cover against the order for 5000 tons of heavy melting steel scrap placed by the Lorain plant of the National Tube Co. The only activity reported is the purchase of a few small lots of turnings by a local plant for its blast furnaces at $8.75. One Valley district consumer is offering $13.50 for heavy melting steel scrap, but probably will be unable to buy very much at that price. Local dealers bought heavy melting steel at $13.50 delivered to fill the Lorain contract and are understood to have sold this scrap at $14 to $14.25 to the dealer who took the order from the mill. Little activity is expected until after the holidays. In spite of the dullness, the market is firm and there are no changes in quotations.

We quote per gross ton, f.o.b. Cleveland, as follows:

Heavy melting steel	$11.50 to $12.00
Steel rails, under 3 ft.	12.50 to 13.00
Steel rails, rerolling	14.00 to 14.50
Iron rails	12.00 to 12.50
Iron car axles	18.00 to 19.00
Low phosphorus melting	13.00 to 13.50
Cast borings	8.50 to 8.60
Machine shop turnings	7.50 to 7.60
Mixed borings and short turnings	8.50 to 8.60
Compressed steel	9.00 to 9.25
Railroad wrought	12.00 to 12.50
Railroad malleable	12.50 to 13.00
Light bundled sheet stampings	6.00 to 7.00
Steel axle turnings	9.00 to 10.00
No. 1 cast	15.00 to 16.00
No. 1 busheling	8.25 to 8.75
Drop forge flashings, over 10 in.	7.50 to 8.00
Drop forge flashings, under 10 in.	7.50 to 8.00
Railroad grate bars	12.75 to 13.00
Stove plate	13.00 to 13.25
Pipes and flues	8.50 to 9.00

An injunction restraining the United States Railroad Labor Board from publishing a decision to the effect that the Pennsylvania Railroad System has violated an agreement with its employees, was issued at Chicago on Dec. 9, by Federal Judge K. M. Landis. Arguments on a plea for a permanent restraining order will be subsequently heard. Attorneys for the railroad contended that the board is authorized to act only when a road and its employees are unable to agree.

Boston

BOSTON, Dec. 13.

Pig Iron.—Sales in this district the past week are estimated at 13,000 tons. Of this amount 7500 tons of No. 2 plain iron was taken by a Westfield, Mass., melter from three furnaces. Details are lacking, but indications are an eastern Pennsylvania furnace took part of the business at $23.36 delivered, and that a New York furnace met this price to secure a part of the tonnage. A Framingham, Mass., heater maker bought 1200 tons No. 2 plain central Pennsylvania iron at about $24 delivered, while a Bristol, Conn., melter took 2000 tons No. 2X at a comparatively low figure. These three tonnages, all for first half delivery, developed fresh weakness in Buffalo and eastern Pennsylvania irons, the former being quoted as low as $18.50, and the latter at slightly more than $19, furnace. Some furnaces sent direct representatives into New England to secure the business. The rest, 2500 tons, was largely No. 2X and No. 1X Buffalo and eastern Pennsylvania, some charcoal, and a little Virginia and Alabama. One melter took 300 tons Alabama at $28.66 base delivered, the largest sale of Alabama iron reported in some time. The best price paid for eastern Pennsylvania No. 1X iron was $21 furnace, but some small lots sold at $20.50, the furnaces, like those in the Buffalo district, disregarding the silicon differentials, especially on first quarter deliveries.

We quote delivered at common New England points as follows, having added to furnace prices $4.06 freight from eastern Pennsylvania, $5.46 from Buffalo, $6.58 from Virginia and $10.66 from Alabama:

East. Penn., silicon 2.25 to 2.75	$24.36 to $25.56
East. Penn., silicon 1.75 to 2.25	23.36 to 25.06
Buffalo, silicon 2.25 to 2.75	23.68 to 25.68
Buffalo, silicon 1.75 to 2.25	23.68 to 25.18
Virginia, silicon 2.25 to 2.75	30.08 to 31.08
Virginia, silicon 1.75 to 2.25	29.58 to 30.58
Alabama, silicon 2.25 to 2.75	29.16
Alabama, silicon 1.75 to 2.25	28.66

Finished Material.—The Boston & Maine Railroad Co. has awarded 2300 tons of structural steel for the Newburyport bridge to Shoemaker-Satterthwaite, Pottstown, Pa. Bids closed yesterday on 250 tons for a Providence, R. I., machine shop. A Boston-New York firm was the low bidder on 430 tons for the Everett, Mass., high school. Figures for estimating purposes are being supplied on a considerable tonnage held over this year, for 1922 fabrication. The market on shapes, plates and bars is 1.50c., Pittsburgh, with occasional sales of small tonnages at 1.55c. and 1.60c. on plates and shapes. These is nothing certain about New England buying of rails. It is possible the Boston & Maine Railroad will not buy a large tonnage this year—not more than 15,000 tons—because it will carry over 6000 to 7000 tons of 1921 rails. The New York, New Haven & Hartford Railroad management is reported as not having made up its tonnage. The company recently bought 100,000 tie plates, about one-third its original inquiry, and it is believed rails will be taken in about the same proportion. It is understood buying by the Maine Central, Bangor & Aroostook and Central Vermont railroads will be under 10,000 tons. The Laconia Car Co. has received an order from the Boston & Maine Railroad for repairs on approximately 1000 wooden freight cars, aggregating more than $1,000,000. This order involves little, if any, steel, but does involve considerable hardware.

Warehouse Business.—The movement of iron and steel bars out of local warehouses is better than it was a week ago but is by no means active. Sheets and structural steel are selling relatively better. More seasonable weather has made for larger sales of blacksmith's supplies of all kinds. The market on brass has advanced another ½c. per lb., making a total advance of 1½c. per lb. since October. Wood screws have declined 5 points to a basis of 82½ per cent discount from print on flat head bright.

Jobbers now quote: Soft steel bars, $2.71½ per 100 lb. base; flats, $3.21½; concrete bars, $2.20 to $2.71½; tire steel, $4 to $4.40; spring steel, open hearth, $4.50; crucible, $11.50; steel bands, $3.31½ to $3.78; steel hoops, $3.31½; toe calk steel, $5; cold rolled steel, $3.75 to $4.25; structural steel, $2.71½; plates, $2.81½ to $2.99; No. 10 blue annealed sheets, $3.73; No. 28 black sheets, $4.50; No. 28 galvanized sheets, $5.50; refined iron, $2.71½; best refined, $4.25; Wayne iron, $5.50; Norway iron, $5.50 base.

Coke.—Further bookings for first half by-product foundry coke at price ruling date of shipment have served to keep interest alive the past week. The total tonnage booked for next year delivery by the two New England coke producers is far below that for the corresponding period last year. In justice it should be said, however, that 1922 business was not accepted until well into November, whereas last year 1921 bookings were taken as early as October. Production and shipments of coke of the New England Coal & Coke Co. and the Providence Gas Co. are just about holding their own, one offsetting the other, but business is very largely confined to domestic and commercial cokes. Both companies quote foundry on a delivered base of $10.66 for December fuel.

Old Material.—Aside from its quietness, the old material market was without special feature the past week. New England foundries are withholding purchases of machinery cast, stove plate, etc., until after the inventory period is passed, and holders of other materials apparently are not milling to accept prices offered by the large dealers.

The following are for gross ton lots delivered consuming points:

No. 1 machinery cast	$18.00 to $19.00
No. 2 machinery cast	16.00 to 17.00
Stove plate	15.50 to 16.00
Railroad malleable	13.50 to 14.00

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$8.00 to $8.25
No. 1 railroad wrought	12.00 to 12.50
No. 1 yard wrought	9.50 to 10.50
Wrought pipe (1-in. in diameter, over 2 ft. long)	7.50 to 8.00
Machine shop turnings	3.50 to 4.00
Cast iron borings, rolling mill	5.50 to 6.25
Cast iron borings, chemical	6.50 to 6.75
Blast furnace borings and turnings	3.50 to 4.00
Forged scrap and bundled skeleton	4.50 to 5.00
Steel car axles and shafting	11.50 to 12.00
Car wheels	11.00 to 12.00
Rerolling rails	10.50 to 11.00

Buffalo

BUFFALO, Dec. 13.

Pig Iron.—Foundries not ordinarily interested in Buffalo iron because of prohibitive freight rates continue to inquire in this district. Not very much of this inquiry is reduced to orders, but it is apparent that distant buyers believe furnaces here are disposed to make concessions not obtainable elsewhere. One furnace has 21,000 tons inquired for and another 16,000 tons, but of course in many instances the same inquiry is considered by both furnaces. Much of the activity is from the New England region and some from eastern Pennsylvania. One company has sold 1500 tons at $20 base, and this seems to be this company's price at furnace for iron to be delivered in New York State. Reports persist of lower prices for delivery in New England, and other distant points, but the low priced iron sold to brokers by a steel company some time ago seems to have been disposed of. One company sold 4000 tons made up of various lots of basic, malleable and No. 2 plain. A furnace which is practically withdrawn as a selling factor quoted $20 base on an inquiry for 1000 tons.

We quote f.o.b. per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.	$20.00 to $21.00
No. 2X foundry, 2.25 to 2.75 sil.	19.50 to 20.50
No. 2 plain, 1.75 to 2.25 sil.	19.00 to 20.00
Basic	20.00 to 21.00
Malleable	20.00 to 21.00
Lake Superior charcoal	31.75

Finished Iron and Steel.—The Lackawanna Steel Co. has been given a portion of the 125,000-ton rail order awarded by the New York Central Railroad, and while definite information is not available, it is understood between 50,000 and 75,000 tons will be rolled here. An improvement is noted in the call for prices on plates and bars and one inquiry for 200 tons of plates for a Buffalo interest is receiving attention. There is a dearth of large structural business, and while a number of enterprises are planned, fabricators generally report a slackening of prospects. The city viaduct work requiring 1800 tons has been awarded to the Lackawanna Bridge Co. Some carload business for pipe has been entered. The inventory period is having an effect on shipments and because of tax conditions, whatever business is placed at this period is not to be shipped until after Jan. 1. While sheet prices have generally been firm, 200 tons of black sheets sold at 2.80c. A price of 1.50c. for carload lots or lower of bars has

been made several times within recent weeks. In plant operation, a wire interest is now operating all its equipment except blast furnaces on a full-time basis.

Warehouse Business.—Sheet orders have been more frequent because of intermittent mill operation and warehouse delivery is more speedy. Structural demand has fallen off and whatever is sought in this line now are mostly "fill-in" orders.

We quote warehouse prices f.o.b. Buffalo as follows: Structural shapes, 2.80c.; plates, 2.80c.; plates, No. 8 gage, 3.50c.; soft steel bars and shapes, 2.70c.; hoops and bands, 3.30c.; blue annealed sheets, No. 10, 3.55c.; galvanized steel sheets, No. 28, 5.25c.; black sheets, No. 28, 4.25c.; cold-rolled strip steel, 5.90c.; cold-rolled round shafting, 3.80c.

Coke.—Very little demand is noticed and the best grades are still obtainable at prices ranging from $4.25 to $4.75 ovens.

Old Material.—Livelier demand for steel at $13.50 has appeared and two mills are eager to buy more than is available at the time. The same disposition to reduce stocks to the lowest extremity is apparent as in former years since tax legislation made such a condition desirable.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	$13.00 to $14.00
Low phos., 0.04 and under	17.00 to 18.00
No. 1 railroad wrought	15.00 to 16.00
Car wheels	16.50 to 17.50
Machine shop turnings	7.50 to 8.00
Cast iron borings	7.00 to 8.00
Heavy axle turnings	10.50 to 11.50
Grate bars	12.00 to 13.00
No. 1 busheling	10.00 to 11.00
Stove plate	15.00 to 16.00
Bundled sheet stampings	8.00 to 9.00
No. 1 machinery cast	17.00 to 18.00
Hydraulic compressed	10.50 to 11.50
Railroad malleable	13.00 to 14.00

Birmingham

BIRMINGHAM, ALA., Dec. 13.

Pig Iron.—Business of the week ending Dec. 10 was done on the $17.50 base as a rule. Some car lots brought $18, but the base was $17.50 on usual transactions. No large tonnage was taken. Pipe shops in the district bought lots of 2000 to 2500 tons uniformly at $17.50. There were less than half a dozen deals of that size. Car lots for prompt shipment came continuously and point to immediate need of iron. It is reported that two makers have offered $17.50 for first quarter, but this could not be confirmed. Inquiry for January and February shipment, especially January, has been brisk and covered considerable tonnage. Inquiry for entire first quarter is negligible. Consumers seem determined not to be hurried. Stocks status at the beginning of the month was again good. Iron on Alabama furnace yards, Nov. 1 and Dec. 1, were as follows: Foundry, 54,000 and 51,000; machine cast, 33,000 and 27,000; warrants, 5900, no change; basic, 50,000 and 42,000; totals, 144,000 and 127,000. The largest individual holding is around 25,000 tons compared with 75,000 tons before furnaces commenced blowing out. The largest active interest shipped production as did two other interests. Makers incline to look for earlier resumption of buying than is usual following the holidays, but cannot foresee large business in competitive fields at present freight rates.

We quote per gross ton f.o.b. Birmingham district furnaces, as follows:

Foundry, silicon 1.75 to 2.25	$17.50
Basic	16.50
Charcoal, warm blast	35.00

Cast Iron Pipe.—Sanitary shops received an unexpected flurry of orders for December delivery. Practically all shops will work until Christmas and take the usual holiday only, resuming by the first of the year. They will manufacture for stock piles in anticipation of good spring trade, whether new business is heavy or not. Cargoes of pipe for Pacific Coast points move regularly out of Mobile. Honolulu has taken 300 tons of water pipe by the same route. High pressure pipe makers forecast a good year in 1922. Independents are at about 60 per cent to capacity. Base of high pressure is $34 to $35 and sanitary pipe is $40.

Coal and Coke.—Coal production has fallen from 300,000 tons a week the latter part of October to 250,000 tons now. De Bardeleben Coal Co. has begun shipment of bunker coal to Galveston via Mobile in ocean-going barges. It is expected to develop return cargoes of sulphur for Steel Cities Chemical Co., Graselli Co. and other Birmingham acid works.

Old Material.—The scrap market could not be more listless. Little is done even at the lower quotations made in the past two weeks.

We quote per gross ton f.o.b. Birmingham district yards as follows:

Steel rails	$11.00 to $12.00
No. 1 steel	10.00 to 11.00
No. 1 cast	14.00 to 15.00
Car wheels	13.00 to 14.00
Tramcar wheels	12.00 to 13.00
No. 1 wrought	12.00 to 13.00
Stove plate	11.00 to 12.00
Cast iron borings	6.00 to 7.00
Machine shop turnings	6.00 to 7.00

New York

NEW YORK, Dec. 13.

Pig Iron.—The week has been one of moderate activity and very low prices. Quotations in eastern Pennsylvania, central Pennsylvania, and also at Buffalo, for delivery in New England and other Eastern points have declined to less than $19, furnace, and in some cases to about $18.50, furnace, for No. 2 plain. The H. B. Smith Co., Westfield, Mass., has contracted for 7500 tons from New York State and eastern Pennsylvania furnaces at $19.30, furnace, for the Pennsylvania iron and on the basis of $18 Buffalo. A furnace company has purchased 2500 tons for first quarter at $20 to $20.50 for No. 2 plain eastern Pennsylvania iron. The National Radiator Co. has purchased 1500 tons for its Johnstown, Pa., plant and the Sessions Foundry Co. 1000 to 2000 tons from an eastern Pennsylvania furnace. A cast iron pipe company has purchased 2000 tons. The Central Foundry Co. is in the market for 2000 to 5000 tons for first quarter for New Jersey and Pennsylvania plants. A Brooklyn melter is inquiring for 300 tons for first quarter delivery, but there are few large tonnages pending and the market is very quiet.

We quote delivered in the New York district as follows, having added to furnace prices $2.52 freight from eastern Pennsylvania, $5.46 from Buffalo and $6.16 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	$22.52 to $23.02
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	22.02 to 22.52
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	21.52 to 22.52
Buffalo, sil. 1.75 to 2.25	23.96 to 24.46
No. 2 Virginia, sil. 1.75 to 2.25	27.16 to 28.16

Ferroalloys.—The inquiries noted a week ago aggregating about 1200 to 1500 tons have not yet developed into orders and other new business is practically at a standstill. Quotations are unchanged although one representative of a British producer calls attention to the possibility of higher prices for the British alloy because of the sharp advance in the pound sterling. The Sheridan furnace of one of the American producers of ferromanganese will blow in this month on ferromanganese. There have been sales of a few carloads of spiegeleisen, 20 per cent, at $26, furnace; otherwise the market is inactive. There is no demand for high grade foreign ore and quotations are nominally unchanged. The 50 per cent ferrosilicon market is inactive and there are no indications yet of contracting for 1922 delivery. Quotations are as follows:

Ferroalloys

Ferromanganese, domestic, delivered, per ton	$60.00 to $63.00
Ferromanganese, British, seaboard, per ton	$58.35
Spiegeleisen, 20 per cent, furnace, per ton	$25.00 to $26.00
Ferrosilicon, 50 per cent, delivered, per ton	$60.00
Ferrotungsten, per lb. of contained metal	40c. to 50c.
Ferrochromium, 6 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr., delivered	10c. to 14c.
Ferrovanadium, per lb. of contained vanadium	$4.50

Ores

Manganese ore, foreign, per unit, seaboard	20c.
Tungsten ore, per unit, in 60 per cent concentrates	$2.00 up
Chrome ore, 40 to 45 per cent Cr_2O_3, crude, per net ton, Atlantic seaboard	$20.00 to $25.00
Chrome ore, 45 to 50 per cent Cr_2O_3, crude, per net ton, Atlantic seaboard	$30.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	45c. to 50c.

Finished Iron and Steel.—Structural steel lettings and inquiries and prospective railroad work feature an otherwise dull December steel market. Though much

of the railroad inquiry, particularly for cars, comes from the Central West, Eastern roads are showing some interest. A prospect, as yet rather indefinite, is that the Norfolk & Western will repair 4000 cars, which would require about 25,000 tons of steel. The Seaboard Air Line has inquired for prices on 1000 box cars, 300 phosphate cars and 200 flat cars. The Central of Georgia has inquired for 500 box cars, and will shortly ask for prices on 200 gondolas and 100 stock cars. The Chesapeake & Ohio has placed 1000 freight cars for repair, of which 500 all-steel cars go to the Liberty Car & Equipment Co, 300 composite cars to the American Car & Foundry Co. and 200 composite to the Ralston Steel Car Co. The Pere Marquette has placed 500 box cars with the Western Steel Car & Foundry Co., with an option on 500 additional. Bids close this week on 500 "more or less" gondolas and hopper cars for the Chesapeake & Ohio Railroad. The distribution of 125,000 tons of heavy rails by the New York Central Lines has been completed. The Lackawanna Steel Co. receives the largest order, 51,500 tons, while the Steel Corporation receives 50,500 tons, divided between Illinois Steel Co., with 34,000 tons, and Carnegie Steel Co., 16,500 tons. Inland Steel Co. receives 8000 tons, Bethlehem Steel Co., 6000 tons, and the Algoma Steel Corporation of Canada, for Canadian lines, 9000 tons. Each order was accompanied by an option for 20 per cent additional tonnage and the required amount of track fastenings. Despite the prospect of labor troubles in the New York building trades, a considerable volume of new structural work is up for bids, including the following: Bank of North America, building at 44 Wall Street, 4000 tons; addition to the Princeton Club in Thirty-ninth Street, New York, 300 tons; Pier 44, North River, New York, 300 tons; factory for Max Aronson, West Thirty-sixth Street, New York, 1100 tons; schoolhouse in Brooklyn, 700 tons. About 12 Brooklyn school buildings, totaling about 8000 tons of steel, have recently been let. Prospective work in other cities includes 500 tons for a hospital building at Johns Hopkins University, Baltimore; a city bridge at Forty-ninth Street, Philadelphia, 200 tons; a building in Albany, N. Y., 1000 tons, and an addition to a store in Richmond, Va., 400 tons. Bids will close this week on 1400 tons of shapes and 700 tons of counterweights for the new South Street bridge, Philadelphia, and next week on 1200 tons of shapes for caissons for the new Philadelphia-Camden bridge. Recent awards include 1000 tons for an apartment building at Broadway and Eighty-fifth Street, New York, to Hedden Iron Construction Co.; 900 tons for the Herald Square Press Building, 1800 tons for a loft building in Seventh Avenue near Thirty-fifth Street, and 300 tons for a telephone exchange building in Boston, all to the Levering & Garrigues Co.; 200 tons for a hotel at Middletown, Ohio, to American Bridge Co.; 2600 tons for a bridge at Newburyport, Mass., to Shoemaker-Satterthwait Co. The Standard Oil Co. of Louisiana has let the contract for five tanks involving 700 tons of steel. A New York State public service company is in the market for 5000 tons of steel gas pipe in four sizes. Prices are weak but substantially unchanged. Fabricated steel work has been sold for delivery in New York at less than $45 per ton. Structural shapes are figured at 1.50c., Pittsburgh, but it is reported that this price has been shaded. Plates, it is known, have been sold at 1.45c., Pittsburgh, and less, and 1.50c. does not seem low enough to take desirable business. Bars are quotable at 1.50c., Pittsburgh. It appears that with the closing of the New York State barge canal to traffic, which will take place shortly, Buffalo mills are no longer quoting 1.80c., delivered New York, on bars, but are again naming prices on a Pittsburgh basis, with full railroad freight rate.

We quote for mill shipments, New York, as follows: Soft steel bars, 1.80c. to 1.88c.; plates, 1.83c. to 1.98c.; structural shapes, 1.88c. to 1.98c.; bar iron, 1.98c. to 2.03c. On export shipments the freight rate is now 28.5c. per 100 lb., instead of 38c., the domestic rate.

Cast-Iron Pipe.—The city of Syracuse, N. Y., awarded the contract of furnishing and laying 6200 tons of 36-in. pipe to the Warren Foundry & Machine Co., Phillipsburg, N. J., shipments to be made throughout the winter. The total contract involved $342,206. The award was won over a bid for furnishing and laying steel pipe for $334,970 because of the assumed greater durability of the cast-iron material. We quote per net ton, f.o.b. New York, carload lots, as follows: 6-in. and larger, $47.30; 4-in. and 5-in., $52.30; 3-in., $62.30, with $4 additional for Class A and gas pipe.

Old Material.—A wider range has developed in market prices due to the fact that the higher prices of a few weeks ago are still being paid by brokers who are filling old contracts, whereas new mill orders are bringing out lower prices. The price tendency is downward. A New York broker has reduced buying prices on seven items during the week, ranging from 25c. to $1.50.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard	$7.50 to $8.50
Steel rails, short lengths, or equivalent	8.50 to 9.50
Rerolling rails	9.50 to 10.50
Relaying rails, nominal	30.00 to 35.00
Steel car axles	11.00 to 12.00
Iron car axles	18.50 to 19.50
No. 1 railroad wrought	11.00 to 11.50
Wrought iron track	8.50 to 9.50
Forge fire	5.00 to 5.50
No. 1 yard wrought, long	9.00 to 9.50
Cast borings (clean)	6.50 to 7.00
Machine-shop turnings	4.00 to 5.00
Mixed borings and turnings	4.00 to 5.00
Iron and steel pipe (1 in. diam. not under 2 ft. long)	7.50 to 8.50
Stove plate	9.00 to 10.00
Locomotive grate bars	9.00 to 10.00
Malleable cast (railroad)	8.00 to 9.00
Car wheels	10.50 to 11.50

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	$16.50 to $17.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	15.50 to 16.00
No. 1 heavy cast, not cupola size	14.00 to 14.50
No. 2 cast (radiators, cast boilers, etc.)	10.00 to 10.50

Cincinnati

CINCINNATI, Dec. 13.

Pig Iron.—While the market continues dull, there are a few inquiries before the trade. The L. & N. Railroad will close Wednesday on 250 tons of Southern. The Standard Sanitary Mfg. Co. is inquiring for 500 tons for shipment to its Louisville plant and the National Cash Register Co. is in the market for 300 tons for January shipment. The Indiana Reformatory is inquiring for 400 tons of foundry iron for first quarter and a Terre Haute malleable shop is interested in 500 to 1000 tons for first half. Another inquiry, for 450 tons, comes from an unnamed melter in this district. During the week, sales were confined almost entirely to carload lots. A Dayton melter took 100 tons and a Michigan melter a similar amount. Among other sales reported was one for 300 tons of Virginia iron to an Eastern melter. Prices are inclined to be softer and it is said that in competitive territory southern Ohio iron can be had at $19.50. Brokers are offering Chicago and Valley irons on the basis of $19.50, furnace. In the South, $18 is sometimes quoted on carload lots, but the usual price is $17.50 on business of fair tonnage. While it is not expected that much business will be done during the remainder of this year, the prospects for first quarter are very much better and sellers are looking to the future with more confidence than has been the case for some months.

Based on freight rates of $4.50 from Birmingham and $2.52 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$22.00 to $22.50
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	22.50 to 23.00
Ohio silvery, 8 per cent sil	30.02
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	22.52 to 23.52
Basic, Northern	22.02
Malleable	23.52

Finished Materials.—The market on finished materials shows very little activity, although several orders of 200 tons each were placed for bars, shapes and plates. These orders are being booked usually at 1.50c., but in the case of small orders 1.60c. is still the general asking price. The sheet market is quiet, but a spurt is looked for shortly after the first of the year, as stocks in jobbers and manufacturers' warehouses at the present time are very light. Some activity is apparent in the structural field. The Danis-Hunt Construction Co. has been awarded the contract for an addition to the Soldiers' Home at Dayton, Ohio. This will take approximately 200 tons of reinforcing

bars, which has been placed with an Ohio mill. Hetherington & Berner, Indianapolis, are low bidders on the Roosevelt office building in that city, which will take about 850 tons of steel. The Insley Mfg. Co., Indianapolis, will fabricate 200 tons of steel for a building for the Rose Polytechnic Institute at Terre Haute. The Virginian Bridge Co. has been awarded a contract for the construction of additional stands for the Memphis, Southern League, baseball club, requiring 300 tons. The American Bridge Co. will fabricate 200 tons for a hotel at Middletown, Ohio. Bids will be received until Jan. 3 for an auditorium and office building at Memphis, Tenn. It is reported that the steel involved will amount to approximately 3500 tons. Bids are in for a hotel at Johnston City, Tenn., about 600 tons of structural steel being involved. There will be no change in plant operations; the last week's schedules being adhered to for the coming week.

Warehouse Business.—Warehouse business is quiet and very little is expected during the remainder of the month. Prices are unchanged.

Iron and steel bars, 2.90c. base; hoops and bands, 3.50c. base; shapes and plates, 3c. base; reinforcing bars, 2.97½c. base; cold rolled rounds, 1½-in. and larger, 3.70c.; under 1½-in. and flats, squares and hexagons, 4.20c.; No. 10 blue annealed sheets, 3.60c.; No. 28 black sheets, 4.25c.; No. 28 galvanized sheets, 5c.; wire nails, $3.25 per keg base; No. 9 annealed wire, $3 per 100 lb.

Tool Steel.—Tool steel is showing a gradual improvement. A reduction of 5c. per lb. in high-speed steel became effective on Dec. 1, and 18 per cent tungsten high-speed steel is now quoted at 85c. per lb.

Coke.—Several inquiries for one to two hundred tons are active in the coke market, but as a general thing the market is dull. Prices continue unchanged, though it is said Connellsville furnace coke can be had at $2.90 on an attractive tonnage. Foundry is quoted at $3.75 to $4.25. Wise County and New River prices remain at $5.25 and $7.50 respectively. By-product producers quote $6.50, Connellsville basis.

Old Material.—The scrap market is very dull and nothing is expected to develop until after the new year. Very little scrap is coming out and dealers are inclined to hold yard stocks for anticipated higher prices. Quotations are unchanged.

We quote dealers' buying prices, f.o.b. cars:

Per Gross Ton		
Bundled sheets	$3.50 to	$4.00
Iron rails	12.00 to	12.50
Relaying rails, 50 lb. and up	25.00 to	26.00
Rerolling steel rails	10.50 to	11.00
Heavy melting steel	9.00 to	9.50
Steel rails for melting	9.00 to	9.50
Car wheels	12.00 to	13.00
Per Net Ton		
No. 1 railroad wrought	8.50 to	9.50
Cast borings	3.00 to	3.50
Steel turnings	2.00 to	2.50
Railroad cast	12.00 to	12.50
No. 1 machinery	13.50 to	14.50
Burnt scrap	7.50 to	8.00
Iron axles	15.50 to	16.50
Locomotive tires (smooth inside)	9.50 to	10.00
Pipes and flues	4.00 to	4.50

St. Louis

ST. LOUIS, Dec. 12.

Pig Iron.—The demand for pig iron has been better than for several weeks past, and there has been some increase in shipping instructions against contract. A sale was made of 150 tons of charcoal iron for first quarter delivery. There was a fair sprinkling of carload orders. A western Iowa melter wants 300 tons and a Texas melter 300 tons of foundry iron. The inventory period is causing a slowing down of orders, however. Stove manufacturers are doing very little. The largest plant in the district is operating only two days a week, while the two next largest are closed down. Jobbing foundries are doing little. There is an inquiry out in this district for four carloads of spiegeleisen. Preparations were being made for blowing in the furnace of the St. Louis Coke & Chemical Co., Granite City, early in the week. The market continues at $20 and $21, Chicago, for Northern iron, and $17.50 and $18, Birmingham, for Southern iron.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.88 freight and war tax from Chicago and $5.91 from Birmingham:

Northern foundry, sil. 1.75 to 2.25	$22.88 to $23.88
Northern malleable, sil. 1.75 to 2.25	22.88 to 23.88
Basic	22.88 to 23.88
Southern foundry, sil. 1.75 to 2.25	23.41 to 23.91

Finished Iron and Steel.—The railroad and oil tank business constitutes the greatest part of the steel trade for the present, the structural demand being off until there is a settlement of the wage question. The 14,000 members of the unions represented in the building trade council are now voting in a referendum as to whether there shall be a reduction of 20 per cent in the present base wage of $1.25 an hour. The Union Pacific Railroad, whose inquiry for 1500 cars was reported in THE IRON AGE last week, has an additional inquiry out for 25 69-ft. baggage cars, 20 all-steel coaches, and 18 all-steel observation cars. The Kansas City Terminal Railway is in the market for 1000 tons of 90-lb. rails and 3000 angle bars. A jobber has inquired for prices on 2000 kegs of spikes and 1500 kegs of track bolts for a Southern railroad. A street railway in this district is in the market for a carload of wheels. New orders for oil tanks include 20 55,000-bbl. tanks placed by the Magnolia Petroleum Co., 10 with the Mount Cooper Boiler Co., Tulsa, Okla., and 10 with the Warren City Tank & Boiler Co., Warren, Ohio. This, in addition to 50 80,000 steel top tanks placed by the Sinclair Oil Co. with the Chicago Bridge & Iron Co.

For stock out of warehouse we quote: Soft steel bars, 2.87½c. per lb.; iron bars, 2.87½c.; structural shapes, 2.97½c.; tank plates, 2.97½c.; No. 10 blue annealed sheets, 3.47½c.; No. 28 black sheets, cold rolled, one pass, 4.10c.; cold drawn rounds, shafting and screw stock, 4.20c.; structural rivets, $3.77½ per 100 lb.; boiler rivets, $3.87½; tank rivets, 7/16 in. and smaller, 60-10 per cent off list; machine bolts, large, 55 per cent; small, 60 per cent; carriage bolts, large, 50-5 per cent; small, 55 per cent; lag screws, 60 per cent; hot pressed nuts, square or hexagon blank, $3.25; and tapped, $3.00 off list.

Coke.—The demand for coke during the last week has been only moderate. The market is at from $4 to $5 for Connellsville brands, which is being met by local producers. One Connellsville producer has withdrawn for the first half of next year, and limited all quotations to Feb. 1 only—for December and January shipments, indicating belief in a stronger market. There is one inquiry for 1500 to 2000 tons of foundry coke a month through the first half, and another for 600 tons for December-January shipment. Domestic coke is showing slight improvement after several weeks of light sales due to the mild weather.

Old Material.—The market for old material is inactive, and the price tendency is lower. One large consumer is reported to have quietly bought a tonnage of iron car wheels and cast scrap, but there has been no other buying of consequence. Consumers are not inclined to swell their inventory; so there will be very little buying during the remainder of this year. The only railroad offering before the market is a list calling for about 9500 tons issued by the Southern Railway.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton		
Old iron rails	$15.50 to	$16.00
Steel rails, rerolling	12.50 to	13.00
Steel rails, less than 3 ft.	13.00 to	13.50
Relaying rails, standard section	25.00 to	30.00
Cast iron car wheels	15.00 to	15.50
No. 1 heavy railroad melting steel	11.00 to	11.50
No. 1 heavy shoveling steel	10.50 to	11.00
Ordinary shoveling steel	10.00 to	10.50
Frogs, switches and guards cut apart	11.00 to	11.50
Ordinary bundle sheet	4.00 to	4.50
Per Net Ton		
Heavy axles and tire turnings	6.50 to	7.00
Iron angle bars	13.00 to	13.50
Steel angle bars	10.00 to	10.50
Iron car axles	20.00 to	21.00
Steel car axles	14.00 to	14.50
Wrought iron arch bars and transoms	15.00 to	15.50
No. 1 railroad wrought	10.50 to	11.00
No. 2 railroad wrought	9.50 to	10.00
Railroad springs	11.50 to	12.00
Steel couplers and knuckles	11.50 to	12.00
Locomotive tires, 42 lb. and over, smooth inside	9.50 to	10.00
No. 1 dealers' forge	9.00 to	9.50
Cast iron borings	6.50 to	7.00
No. 1 busheling	10.00 to	10.50
No. 1 boilers cut in sheets and rings	8.00 to	8.50
No. 1 railroad cast	14.50 to	15.00
Stove plate and light cast	12.50 to	13.00
Railroad malleable	10.00 to	10.50
Agricultural malleable	9.50 to	10.00
Pipes and flues	7.50 to	8.00
Heavy railroad sheet and tank	6.50 to	7.00
Light railroad sheet	4.50 to	5.00
Railroad grate bars	10.00 to	10.50
Machine shop turnings	6.00 to	6.50
Country mixed iron	7.50 to	8.00
Uncut railroad mixed	8.50 to	9.00
Horseshoes	11.00 to	11.50
Railroad brake shoes	9.50 to	10.00

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight Rates

Freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia, domestic	$0.35	Kansas City	$0.815
Philadelphia, export	0.265	Kansas City (pipe)	0.77
Baltimore, domestic	0.335	St. Paul	0.665
Baltimore, export	0.255	Omaha	0.815
New York, domestic	0.38	Omaha (pipe)	0.77
New York, export	0.285	Denver	1.35
Boston, domestic	0.415	Denver (wire products)	1.415
Boston, export	0.285	Pacific Coast	1.665
Buffalo	0.295	Pacific Coast, ship plates	1.335
Cleveland	0.24	Birmingham	0.765
Detroit	0.325	Jacksonville, all rail	0.555
Cincinnati	0.325	Jacksonville, rail and water	0.46
Indianapolis	0.345	New Orleans	0.515
Chicago	0.38		
St. Louis	0.475		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 55c.; ship plates, 75c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 75c.; sheets and tin plates, 60c. to 75c.; rods, wire rope, cable and strands, $1; wire fencing, netting and stretcher, 75c.; pipe, not over 8 in. in diameter, 75c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, ¼ in. thick and over, and zees, structural sizes, 1.50c. to 1.60c.

Sheared plates, ¼ in. and heavier, tank quality, 1.50c. to 1.60c.

Wire Products

Wire nails, $2.75 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of $1.25 and shorter than 1 in., $1.75; bright Bessemer and basic wire, $2.50 per 100 lb.; annealed fence wire, Nos. 6 to 9, $2.50; galvanized wire, $2.95; galvanized barbed wire, $3.40; galvanized fence staples, $3.40; painted barbed wire, $2.90; polished fence staples, $2.90; cement-coated nails, per count keg, $2.35; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days, net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 68 to 70½ per cent off list for carload lots; 67 to 69½ per cent for 1000-rod lots, and 66 to 68½ per cent for small lots, f.o.b. Pittsburgh.

Bolts and Nuts

Machine bolts, small, rolled threads, 70, 10 and 5 to 70, 10 and 7½ per cent off list
Machine bolts, small, cut threads, 70 and 5 to 70 and 10 per cent off list
Machine bolts, larger and longer, 65, 10 and 5 to 70 and 10 per cent off list
Carriage bolts, ⅜ in. x 6 in.:
Smaller and shorter rolled threads, 65, 10 and 10 per cent off list
Cut threads ..... 65 and 10 to 70 per cent off list
Longer and larger sizes ..... 65 and 10 to 70 per cent off list
Lag bolts ..... 70 and 10 to 70, 10 and 5 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads .... 60 and 10 per cent off list
Other style heads ..... 20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ in. x 4 in.:
Smaller and shorter ..... 65 and 5 per cent off list
Larger and longer sizes ..... 65 per cent off list
Hot pressed sq. or hex. blank nuts ..... $5.50 off list
Hot pressed nuts, tapped ..... $5.00 to $5.25 off list
C.p.c. and t. sq. or hex. blank nuts ..... $5.25 off list
C.p.c. and t. sq. or hex. blank nuts, tapped ..... $5.00 off list
Semi-finished hex. nuts:
¼ in. to 9/16 in. inclusive ..... 80, 10 and 10 per cent off list
Small sizes S. A. E. ..... 80, 10, 10 and 10 per cent off list
⅝ in. to 1 in. inclusive, U. S. S. and S. A. E. 70, 10, 10 and 10 per cent off list
Stove bolts in packages ..... 80, 10 and 5 per cent off list
Stove bolts in bulk ..... 80, 10 and 7½ per cent off list
Tire bolts ..... 65, 10 and 10 per cent off list
Track bolts, carloads ..... 3.25c. to 3.50c. base
Track bolts, less than carloads ..... 4.25c. to 4.50c.

Upset Square and Hex. Head Cap Screws

½ in. and under ..... 75 and 10 to 80 and 10 per cent off list
9/16 in. to ¾ in. ..... 75 and 10 to 80 and 10 per cent off list

Upset Set Screws

½ in. and under ..... 80, 10 and 5 to 85 per cent off list
9/16 in. to ¾ in. ..... 80, 10 and 5 to 85 per cent off list

Milled Square and Hex. Cap Screws

All sizes ..... 70 and 10 per cent off list

Milled Set Screws

All sizes ..... 70, 10 and 5 per cent off list

Rivets

Large structural and ship rivets ..... $2.25 to $2.40 base
Large boiler rivets ..... 2.35 to 2.50 base
Small rivets ..... 70, 10 and 5 to 70, 10 and 10 per cent off list

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $38; chain rods, $38; screw stock rods, $43; rivet and bolt rods and other rods of that character, $38; high carbon rods, $46 to $50, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, 9/16-in. and larger, $2.25 base per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, ½-in., ⅝-in. and 7/16-in., $2.40 base; 5/16-in., $2.40 base. Boat and barge spikes, $2.40 to $2.50 base per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Track bolts, $3.25 to $3.50 base per 100 lb. Tie plates, $2 per 100 lb. Angle bars, $2.40 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., $9.30 per package; 8-lb. coating, I. C., $9.60; 15-lb. coating, I. C., $11.80; 20-lb. coating, I. C., $13; 25-lb. coating, I. C., $14.25; 30-lb. coating, I. C., $15.25; 35-lb. coating, I. C., $16.25; 40-lb. coating, I. C., $17.25 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars, 1.50c. to 1.60c. from mill. Refined bar iron, 2c. to 2.10c.

Welded Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Butt Weld

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
⅛	54½	28	¼ to ⅜	+ 3½	+22½
¼ to ⅜	57½	31	½	36½	18½
½	62½	48	¾	42½	27½
¾	66½	54	1 to 1½	44½	29½
1 to 3	68½	56			

Lap Weld

2	61½	49	2	39½	25½
2½ to 6	65½	53	2½ to 6	42½	29½
7 to 8	62½	49	7 to 12	40½	27½
9 to 12	61½	48			

Butt Weld, extra strong, plain ends

⅛	50½	33	¼ to ⅜	+ 4½	+37½
¼ to ⅜	53½	35	½	35½	23½
½	59½	48	¾	42½	28½
¾	64½	53	1 to 1½	44½	30½
1 to 1½	66½	55			
2 to 3	68½	56			

Lap Weld, extra strong, plain ends

2	59½	48	2	40½	27½
2½ to 4	63½	52	2½ to 4	43½	31½
4½ to 6	62½	51	4½ to 6	42½	30½
7 to 8	58½	45	7 to 8	35½	23½
9 to 12	52½	39	9 to 12	30½	18½

To the large jobbing trade the above discounts are increased by one point, with extra discounts of 5 and 2½ per cent.

Boiler Tubes

The following are the discounts for carload lots f.o.b. Pittsburgh:

Lap Welded Steel		*Charcoal Iron*	
1¾ in.	26½	1½ in.	5
2 to 2¼ in.	41	1¾ to 1⅞ in.	15
2½ to 3 in.	52	2 to 2¼ in.	25
3¼ to 13 in.	57	2½ to 3 in.	30
		3¼ to 4½ in.	32

Standard Commercial Seamless Boiler Tubes

New discounts have been adopted on standard commercial seamless boiler tubes, but manufacturers are not yet ready to announce them for publication, and for that reason we publish no discounts this week.

Sheets

Prices for mill shipments on sheets of standard gage in carloads, f.o.b. Pittsburgh, follow:

Blue Annealed

Cents per Lb.		Cents per Lb.	
No. 8 and heavier	2.20	Nos. 11 and 12	2.30
Nos. 9 and 10 (base)	2.25	Nos. 13 and 14	2.35
		Nos. 15 and 16	2.45

Box Annealed, One Pass Cold Rolled

Cents per Lb.		Cents per Lb.	
Nos. 17 to 21	2.80	No. 28 (base)	3.00
Nos. 22 to 24	2.85	No. 29	3.10
Nos. 25 and 26	2.90	No. 30	3.20
No. 27	2.95		

Galvanized

Cents per Lb.		Cents per Lb.	
Nos. 10 and 11	3.00	Nos. 25 and 26	3.70
Nos. 12 to 14	3.10	No. 27	3.85
Nos. 15 and 16	3.25	No. 28 (base)	4.00
Nos. 17 to 21	3.40	No. 29	4.25
Nos. 22 to 24	3.55	No. 30	4.50

Tin-Mill Black Plate

Cents per Lb.		Cents per Lb.	
Nos. 15 and 16	2.80	No. 28 (base)	3.00
Nos. 17 to 21	2.85	No. 29	3.05
Nos. 22 to 24	2.90	No. 30	3.05
Nos. 25 to 27	2.95	Nos. 30½ and 31	3.10

NON-FERROUS METALS

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Tin	Lead		Zinc	
Dec.	Lake	Electro-lytic	New York	New York	St. Louis	New York	St. Louis
7.....	13.75	13.50	31.50	4.70	4.40	5.37½	4.87½
8.....	13.75	13.50	31.50	4.70	4.40	5.30	4.87½
9.....	13.75	13.50	32.00	4.70	4.40	5.25	4.90
10.....	13.75	13.50	....	4.70	4.40	5.25	4.90
12.....	13.75	13.50	33.50	4.70	4.40	5.20	4.85
13.....	13.75	13.50	32.75	4.70	4.40	5.20	4.85

New York

NEW YORK, Dec. 13.

The markets continue moderately active and strong. The tendency of the copper market is higher with the volume of sales increasing. Prices of tin have advanced with the spectacular rise in the exchange market and because of other conditions. The lead market is quiet and firm. Demand for zinc is light but the price situation is steady.

Copper.—The principal change in the electrolytic copper market which has developed during the week is the gradual tendency of the minimum price of 13.75c., delivered, for early delivery to disappear. While some metal for this position at this price is still available, consensus of opinion is to the effect that within a very short time at least 13.87½c., if not 14c., delivered, will be the minimum for early or 30-day delivery. The first quarter position is still a minimum of 14c., delivered, or 13.75c., refinery. In the last few days there had been more buying for prompt delivery than has been anticipated, indicating more activity among manufacturers and limited stocks for early use. Domestic buying for first quarter is moderately active and demand from foreign countries continues brisk. Deliveries into consumption in November are known to have been larger than those for October and it can be stated that stocks have been correspondingly reduced. The price for foreign consumption is at a minimum of 14c., f.a.s.

Tin.—The feature of this market is the large advance made in the last few days in the pound sterling and this has of course had its effect on the price of tin. An advance of 14 points in the British pound means 1c. per lb. in the price of tin and as the pound sterling has advanced considerably more than this the higher price for tin is partially explained. The London tin market has also gone higher, which has been another factor in the price situation. Spot Straits tin to-day is quoted at 32.75c., New York, which is 1c. higher than a week ago, and the London market to-day was £169 15s. for spot standard, £171 10s. for future standard and £170 7s. 6d. for spot Straits, all about £2 per ton higher than last week. Generally the market has been quiet so far as sales are concerned, these having been moderate to light in volume, with here and there fair orders reported. Late last week profit taking parcels appeared which had a slightly disturbing influence, but these have been cleared up; they are, however, likely to appear periodically under present conditions. Since much of the business in the past has been with consumers, it is expected by some that the December deliveries into consumption will be larger and that the stocks on Jan. 1 will be small. It is also the opinion that considerable tin is on the way to meet the spot and nearby needs. Another opinion is to the effect that there will be a shortage for the greater part of the month with a premium on spot tin in case there develops any demand for the metal. The advance in sterling and the higher price in London on Friday and yesterday were so sharp as to temporarily choke off buying on this side. To-day there was reaction in exchange but very little buying. A sale of 120 tons on the New York Metal Exchange is noted. Arrivals thus far this month have been 1695 tons with 4740 tons reported afloat.

Lead.—There has been very little change, the market remaining firm with a steady demand. The leading interest continues to take business at 4.70c., New York and St. Louis, while independents are asking 4.75c., New York, and 4.40c., St. Louis. The London market has advanced, and this together with the higher value of the pound sterling made London prices of lead for spot and future delivery 15 to 18 points per lb. higher.

Zinc.—Demand is moderate for early delivery but there is more inquiry for first quarter. The new freight rates on prime Western from St. Louis to Eastern points of 35c. per 100 lb., instead of 50c., went into effect yesterday, which modifies the New York differential. Prime Western for early delivery is but little changed from a week ago at 4.85c., St. Louis, but the New York price is now 5.20c. as against 5.35c. a week ago, due to the new freight rate. Quotations for first quarter are about five points up for each month, with the delivery for the entire quarter quoted at 4.95c. to 5c., St. Louis.

Antimony.—Wholesale lots for early delivery are quoted at 4.50c., New York, duty paid, with prompt metal at 4.55c.

Aluminum.—The leading interest continues to quote 19c., f.o.b. plant, for wholesale lots of virgin metal, 98 to 99 per cent pure, for early delivery with the same grade sold by importers at 17c. to 18c. New York, duty paid.

Old Metals.—The market continues strong but business is moderate. Dealers' selling prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	13.25
Copper, heavy and wire	12.25
Copper, light and bottoms	10.00
Heavy machine composition	10.25
Brass, heavy	7.75
Brass, light	6.00
No. 1 red brass or composition turnings	8.25
No. 1 yellow rod brass turnings	6.25
Lead, heavy	4.25
Lead, tea	3.25
Zinc	3.00

Chicago

DEC. 13.—Tin has advanced, principally on account of exchange, while the prices of other metals remain unchanged. There has been some activity in tin during the advance, but on the whole the market is quiet. A number of grades of old metal have advanced in sympathy with recent changes in new material. We quote in carload lots: Lake copper, 13.75c.; tin, 34.50c.; lead, 4.45c.; spelter, 4.95c.; antimony, 6.50c., in less than carload lots. On old metals we quote: Copper wire, crucible shapes and copper clips, 10.25c.; copper bottoms, 8c.; red brass, 8c.; yellow brass, 5.25c.; lead pipe, 3.25c.; zinc, 2.37½c.; pewter, No. 1, 23c.; tin foil, 24c.; block tin, 26c.; all buying prices for less than carload lots.

St. Louis

ST. LOUIS, Dec. 12.—Lead is practically unchanged while zinc is slightly higher than last week. We quote lead at 4.40c. to 4.45c., carlots, and zinc at 4.90c. to 4.92c. We quote Lake copper, 14.48½c. in carlots; tin, 33.11c., and antimony, 5.23½c. to 5.28½c. On old metals we quote: Light brass, 3.50c.; heavy red brass and light copper, 7c.; heavy yellow brass, 4c.; heavy copper and copper wire, 7.50c.; zinc, 2c.; pewter, 15c.; tin foil, 16c.; tea lead, 2c.; aluminum, 9c.

Secretary of Commerce Herbert Hoover made the interesting statement recently that he was the second engineer in the 155 years of the history of the United States to hold a high office under the Government, George Washington having been the first. He regards the engineer as particularly fitted to render service to the public by virtue of his training and his ideals. He is accustomed to dealing with facts, and incidentally Mr. Hoover's ambition is to have the Department of Commerce known as a fact procuring department, and not necessarily with controlling functions.

PERSONAL

H. M. Thompson will represent the Quigley Furnace Specialties Co., 26 Cortlandt Street, New York, manufacturer of Hytempite, high temperature cement, Insulbrix and other heat insulation products in the Chicago territory. He was formerly identified with the Thomas Moulding Brick Co. He succeeds Bell & Gossett, former agents for the Quigley company. His headquarters will be at 105 West Monroe Street, Chicago.

C. F. Meyer, assistant secretary Landis Machine Co., Waynesboro, Pa., manufacturer of bolt and pipe threading machines, has returned from a year's trip around the world. His itinerary included India, Java, China, Japan and the Hawaiian Islands. J. M. McNeal, sales engineer Landis Machine Co., has returned after a year and three months in England and the Continent.

Charles H. Bromley, formerly technical director Richardson-Phenix Co., Milwaukee, is now manager and chief engineer of the newly formed Richardson-Phenix division of S. F. Bowser & Co., Inc. This division will conduct the filtration and lubrication appliance business of the consolidated companies, with main office at Fort Wayne, Ind.

S. H. Schachtel has succeeded S. W. Platt as manager of the Pittsburgh office of the David J. Joseph Co., Cincinnati, iron and steel scrap.

A. A. Albaugh, formerly general superintendent Jacobson Machine Mfg. Co., has been appointed vice-president and general manager of the Barnhart-Davis Co., Warren, Pa., iron and brass works.

C. B. Adams has been appointed vice-president and sales manager of the Maher Engineering Co., contracting engineer, with offices in Chicago, Detroit and Cleveland. C. H. Peterson has been appointed secretary-treasurer and general manager.

Andrew Fletcher, president American Locomotive Co., has been elected a director of the American Car & Foundry Co., filling the vacancy on the board caused by the resignation of Walter G. Oakman.

W. J. Priestly, metallurgical engineer Naval Ordnance Plant, South Charleston, W. Va., has been elected chairman of the board of registration for engineers of West Virginia. The board was provided by a recent act of the legislature of that state, its duties being to examine credentials and register all engineers practising in the state. Mr. Priestly is not able to serve in this capacity because of Civil Service law. C. S. MacCalla, vice-president and general manager Virginia Power Co., was appointed in his stead for the term ending June 30, 1922. Other members of the board are: George E. Taylor, Anderson & Taylor, consulting engineers, Charleston-Kanawha, W. Va., who is also president of the Charleston chapter of the Association of American Engineers; Frank Haas, Fairmont, consulting engineer Consolidation Coal Co.; H. C. Cooper, Clarksburg, general superintendent Hope Gas Co.; N. H. Manakee, Bluefield, W. Va.

James D. Erskine, formerly manager of the Eastern branch of the American Radiator Co., New York, has been made vice-president in charge of sales of the Fitzgibbons Boiler Co., Inc., Oswego, N. Y., which has now established a branch in New York with offices in the Bryant Arcade Building, 47 West Forty-second Street.

Charles F. Smith, chairman board of directors Landers, Frary & Clark, New Britain, Conn., has been made temporary chairman of the board of directors of the New Britain Machine Co., automatic screw machines. He will hold office during the absence of F. G. Platt, who is at Johns Hopkins Hospital, Baltimore.

John L. Artmaier has been appointed sales manager of the railroad department of the Buda Co., Harvey, Ill., with headquarters in the Railway Exchange Building, Chicago. J. E. Murray, formerly assistant to Mr. Artmaier, will be Eastern sales manager, and J. H. Maher, formerly the company's representative at Buenos Aires, Argentina, has been appointed Eastern export manager, both with headquarters at 30 Church Street, New York.

Charles M. Power, vice-president and general manager of sales, United States Chain & Forging Co., Pittsburgh, since its organization in 1919, has resigned, effective Jan. 1, 1922. He has made no definite plans for the future. Mr. Power was born in Franklin, Pa., Feb. 2, 1868, and has been identified with the chain business since 1904, when he became secretary and general manager of the Seneca Chain Co., Kent, Ohio, which grew materially under his management. In 1909 he severed that connection to become general manager of sales of the Standard Chain Co., which was absorbed by the American Chain Co. in 1916, and with which company he continued as sales manager until January, 1919. During the war Mr. Power was active in the Chain Manufacturers Association which was charged with securing for the various governmental departments a sufficient amount of chain for war purposes. He is chairman of the executive committee of the American Hardware Manufacturers Association.

Frank L. Cone, Windsor, Vt., has been elected president of the Coates Clipper Mfg. Co., 237 Chandler Street, Worcester, Mass. J. W. Watson continues as general manager.

J. J. Andrews, Boston Bridge Works, Boston, is convalescing at a local hospital from an appendicitis operation.

Thomas Hoope, Jr., has resigned as general manager of the Wilcox, Crittenden & Co., Middletown, Conn., marine hardware. He was associated with the company for more than 20 years.

Nils Anderson, president Debevoise Anderson Co., New York, has returned from a trip to England, Norway, Sweden, France and other countries of Europe. He found strong sentiment in favor of helping Germany to improve its industrial condition, as the belief is general that world prosperity will not be restored until Germany becomes much stronger as a manufacturing nation.

William J. O'Toole, Gary, W. Va., who has been appointed American Minister to Paraguay, is the son of Col. Edward O'Toole, general superintendent of the United States Coal & Coke Co., a subsidiary of the H. C. Frick Coke Co.

In the list of officers of the Eastern States Blast Furnace and Coke Oven Association, recently organized in Pittsburgh, published in THE IRON AGE Dec. 8, the name of E. T. Vogel, superintendent by-product plant, Youngstown Sheet & Tube Co., Youngstown, was inadvertently omitted. Mr. Vogel is vice-president.

Thomas A. McGinley, vice-president and general manager Duff Mfg. Co., Pittsburgh, recently was elected to the board of directors of the Westinghouse Air Brake Co., Pittsburgh, taking the place of his father, John R. McGinley, who recently resigned.

Samuel P. Broome has been appointed Pittsburgh district manager for Naylor & Co., New York, succeeding George C. Mills, who resigned to go into business for himself under the firm name of Lippincott & Mills, New York and Cleveland. Mr. Broome recently had been affiliated with Stalnaker & Co., and previously for a number of years was with the A. M. Byers Co., and before that with the Republic Iron & Steel Co.

Louis A. Mertz, who has been for the past six years, assistant to James L. Cox, treasurer Dravo Contracting Co., has been appointed secretary of the company in place of the late John J. Nolan.

A settlement of the wage scale in the building industries of Cincinnati has been arrived at whereby the workers will receive increases of from 5 to 12½c. an hour over the scale recently made by the umpire in arbitration proceedings. The wage scale will go into effect immediately and will expire December 23, 1922. The wage agreement with all crafts in the buildings trade will terminate on the same date.

OBITUARY

THOMAS G. FITZSIMONS, president Fitzsimons Co., Youngstown, Ohio, and a pioneer in the manufacture of cold-drawn steel, died at his home in Cleveland on Dec. 9, aged 73 years. He is credited with developing the process for manufacturing cold-drawn steel about 40 years ago at the plant in which he was associated with his father in Cleveland and where he obtained his preliminary training as a molder. The foundry was conducted under the name of Fitzsimons & Son. Mr. Fitzsimons did the experimental work on cold-drawn steel in this foundry. He succeeded to the business on the death of his father, and 18 years ago purchased a plant in Youngstown for the manufacture of cold-drawn steel. This business was later incorporated under the name of the Fitzsimons Co. However, Mr. Fitzsimons continued to reside in Cleveland. He has had three sons associated with him in the business. These are Robert R. Fitzsimons, vice-president and secretary; James R. Fitzsimons, manager, and Thomas G. Fitzsimons, superintendent. Mr. Fitzsimons was active in civic and political affairs, particularly in a tax reform movement and recently was a member of the executive committee of the Cleveland Foundation. He ran twice for mayor in Cleveland as an independent candidate.

EDGAR W. SUMMERS, 63 years old, president Summers Steel Car Co., Pittsburgh, and designer of numerous devices for loading and unloading ore cars and ore boats, died Dec. 8, at the home of his daughter, Mrs. Charles L. Baker, Glenshaw, Pa. Mr. Summers was born in Bellebrooke, Ohio. He became chief engineer of the Wellman-Seaver-Morgan Co., Cleveland, where he developed the modern type of car dumper and ore unloader now in use on the Great Lakes boats. In later years he developed many improvements on freight car equipments, particularly of value in the handling of ore. In 1908 he organized the Summers Steel Car Co. He was a member of the Engineers Society of Western Pennsylvania.

FRANK B. CHOLLAR, 70 years old, Pittsburgh representative Morse Twist Drill & Machine Co., New Bedford, Mass., died Dec. 9.

JAMES SAUNDERS, president Saunders Machine Co., Dayton, Ohio, manufacturer of general and milling machinery, died at his home in that city on Nov. 28. He was 66 years old.

JOHN A. SKIFF, traveling salesman for the Geuder P. Paeschke & Frey Enamelware Co., Milwaukee, died of heart failure in New Orleans on Dec. 3. He was well known in the hardware trade.

ALBERT H. CHAPMAN, secretary-treasurer Walsh & Weidner Boiler Co, Chattanooga, Tenn., died suddenly of ptomaine poisoning recently. He had been with the Walsh & Weidner company for 29 years. He was prominent in church and fraternal circles.

CLARENCE E. ROOD, vice-president and sales manager Gould Coupler Co., New York, died Dec. 12 at the Algonquin Hotel in that city at the age of 67. Early in life he became a member of Rood & Brown, car wheel builders, Buffalo. For the past 12 years he has been associated with the Gould Coupler Co. in the New York office.

JOHN MCCLARY, founder McClary Mfg. Co., one of the largest stove manufacturing concerns in the British Empire, died at his home in London, Ont., Dec. 11, at the age of 93.

HENRY CLAY EVANS, a manufacturer of iron, steel and railroad cars at Chattanooga, Tenn., a former Commissioner of Pensions and one time Consul General at London, died at his home in Chattanooga on Dec. 12. He was born in Juniata County, Pennsylvania, June 18, 1843. He was prominent in Republican politics and held many high offices.

Keystone Coal & Coke Co. Takes Over Jamison Properties

PITTSBURGH, Dec. 13.—Negotiations have been practically concluded and an official announcement is expected about Jan. 1 whereby the Keystone Coal & Coke Co., Philadelphia, will take over the properties of the Jamison Coal & Coke Co., Greensburg, Pa., in the so-called Greensburg Basin, Westmoreland County. About 3000 acres of coal land and 1309 beehive coke ovens comprise the holdings of the Jamison company involved in the deal, the consideration for which is understood to be around $10,000,000. The Keystone company has extensive areas adjacent to the Jamison properties, negotiations for the purchase of which have been started several times previously but never concluded. Dominant interests in the Jamison company for several years have been trying to sell. Other properties of this company located in Westmoreland and Washington counties in Pennsylvania and in West Virginia are not included in the transfer.

The Bethlehem Steel Corporation some time ago purchased a large part of the West Virginia coal lands of the Jamison company, and that company also takes the bulk of the output of coal from the mines still held by the Jamison company under a long-time contract. Because of this fact, there have been reports that the Bethlehem Steel Corporation was behind the Keystone-Jamison deal with an idea of taking over the combination, but such reports find little credence here, and it is believed that the Keystone Coal & Coke Co. will remain independent.

Automotive Body Manufacturers Combine

The L. C. Graves Co., Springboro, Pa., manufacturer of commercial car and truck bodies, has purchased the Moore Motor Co. plant and will operate it under the name of United Automotive Body Co., Danville, Ill. The new company will be capitalized at $1,250,000 and will employ 500 men. It will embody the present L. C. Graves Co., the Danville plant and the United Automobile Body Co., Cleveland, the latter company having been purchased by the Graves company a short time ago. The large assembly floor at the Danville plant will be used exclusively for steam and electric railroad body equipment, such as is required for gasoline-driven railroad coaches, which are becoming extensively used for branches, extensions and short runs on both steam and electric lines. The Pennsylvania plant will supply the Eastern demand and the Danville plant will take care of Ohio and States west.

Richardson-Phenix Co. and S. F. Bowser & Co., Inc., Consolidate

The Richardson-Phenix Co. and S. F. Bowser & Co., Inc., have consolidated. The filtration and lubrication appliance business of both companies will be conducted by the Richardson-Phenix division, S. F. Bowser & Co., Inc., with main offices at Fort Wayne, Ind. J. William Peterson, president Richardson-Phenix Co., will assume the office of vice-president of S. F. Bowser & Co., Inc. and will be in charge of the Richardson-Phenix division. The highly specialized personnel and factories of the Richardson-Phenix Co. are retained. The assets of the consolidation are valued at $10,000,000.

Engineering Honors Conferred on Foch by Four Societies

Honorary membership was conferred by all four of the founder engineering societies on Marshal Ferdinand Foch of France on Tuesday afternoon, Dec. 13, at the Engineering Societies Building, New York. For the four societies jointly to confer this honor is unprecedented. The ceremonial was in charge of representatives of the American Society of Civil Engineers, the American Institute of Mining and Metallurgical Engineers, the American Society of Mechanical Engineers and the American Institute of Electrical Engineers.

SHORT TRADE ITEMS

The R. H. Beaumont Co., Philadelphia, contractor for coal, coke and ash-handling systems at boiler houses and gas plants, is increasing its sales force as follows: P. K. Reed, formerly chief engineer, will enter the sales department and will be located at Philadelphia. H. D. Williams, a former engineer, will enter the sales department and will be added to the New York office force. The company's Pittsburgh office will move to the Oliver Building and will be in charge of Charles W. Ross, formerly New York manager.

Manning, Maxwell & Moore, Inc., New York, have installed a power transmission department as a subdivision of the supplies department. Dallas W. Clem, formerly of the Reeves Pulley Co., has been placed at the head of this new division. He has spent his entire business life in the mill supply field, more particularly in the line of power transmission. As a transmission engineer he has had eight years of practical experience and has made installations of all kinds of transmission appliances in almost every type of manufacturing industry. He has specialized in installations for giving variable speeds.

D. W. CLEM

The New York office of the Blaw-Knox Co. will be removed Dec. 15 from the City Investing Building to the Carbide & Carbon Building, 30 East Forty-second Street.

The Andrews-Bradshaw Co., sales engineer, formerly located on the third floor of the B. F. Jones Building, Pittsburgh, has moved to the eighth floor of the same building, thereby doubling office space. This company is the Pittsburgh office for the Copes boiler feed regulators and pump governors, the Falls automatic engine stops, steam motor turbines, Wyoming traps, eliminators and separators, Coppus turbo blowers, Coppus turbines, Coppus Vano and propeller type blowers, Tracy steam purifiers, Bradshaw blast furnace gas burners, Dravo superheaters and Ellison draft gages and Liptak double suspension arches.

Russell, Holbrook & Henderson, Inc., 30 Church Street, New York, have been appointed exclusive sales representatives of the Diamant Tool & Mfg. Co., Inc., of 91-97 Runyon Street, Newark, N. J., in connection with Diamant standard punch and die sets covering the territory in New Jersey north of Trenton, all of New York City and New York State, south of Kingston, and all of Connecticut west of the Connecticut River.

The Detroit Range Boiler Steel Barrel Co., Detroit, will transfer its bilge barrel and drum department from Detroit to its Toledo plant, where additional room is being obtained through the erection of a portable steel building. The machinery will be transferred before Jan. 1.

John H. Lloyd, who has been associated with the Rivetless Chain & Engineering Co., Avon, Pa., for the past five years, in charge of all drop forge work, has resigned and organized the Lloyd Forge Co., Lebanon, Pa., to manufacture patented drop forged hexagonal turnbuckles. The new company has leased part of the Weaver machine shop and is already equipping it. Mr. Lloyd, the patentee and inventor of this and several other drop forged devices, will take entire charge as secretary and general manager. Other officials of the company are W. L. Beyerle, president and treasurer, and Joseph F. Lloyd, vice-president.

The Whiting Corporation, Harvey, Ill. (Chicago suburb), has purchased a controlling interest in the Grindle Fuel Equipment Co., manufacturer of complete powdered coal plants for use in connection with malleable furnaces, annealing ovens, steam boilers, billet heating and various other types of furnaces. The Grindle company has moved its offices to Harvey, Ill., and will continue its business under the same name. The Whiting Corporation will manufacture all Grindle equipment. The following officers have been elected: President, B. H. Whiting; secretary and treasurer, T. S. Hammond; vice-president and general manager, A. J. Grindle; board of directors, J. H. Whiting, B. H. Whiting, T. S. Hammond, A. J. Grindle, R. H. Bourne, N. S. Lawrence and A. H. McDougall.

Two Milwaukee tool manufacturing companies—the Wetmore Reamer Co., making a line of expanding reamers, including cylinder reaming sets, and the Wisconsin Tool & Supply Co., manufacturer of special tools, jigs, dies, fixtures and thread gages—have been consolidated and will hereafter be operated under the name of the Wetmore Reamer Co. The Wetmore company will specialize in the manufacturing of expanding reamers for high speed and quantity production work; also expanding machine reamers under 1 in. which have been developed within the last six weeks. It will continue the building of tools, dies, fixtures and special thread gages. The officers of the consolidated corporation elected at a recent reorganization meeting are as follows: President and general manager, Edward J. Waltzer; vice-president, Charles G. Forster; secretary, Charles F. Puls, Jr.; treasurer, Carl A. Forster; general superintendent, Edward D. Johnson. The direct management of this company is under the supervision of the Wisconsin Tool & Supply Co.'s men who have had experience in the building of small tools.

The Koppel Industrial Car & Equipment Co., Koppel, Pa., has opened a district office at Kansas City, Mo., in the Railway Exchange Building. Harry C. Kraft, formerly with the New York office, has been appointed manager of the Kansas City district.

The Orton & Steinbrenner Co., Chicago, manufacturer of locomotive cranes, clam shell and orange peel buckets, has made arrangements with the F. C. Richmond Machinery Co., 117 West Second Street, Salt Lake City, Utah, to represent it.

The Rich Tool Co., Chicago, has appointed the Busch Corporation, St. Louis, its representatives in the St. Louis territory.

Manning, Maxwell & Moore, Inc., New York, have taken new office quarters in Philadelphia, having moved from the Lincoln Building to the Pennsylvania Building, Fifteenth and Chestnut streets, rooms 905 and 906. New quarters have also been taken in Boston, the company having moved from 10 High Street to the Textile Building, 99 Chauncey Street, rooms 802 and 803.

The Exeter Machine Works, Inc., West Pittston, Pa., has appointed the H. M. Stark Machinery Co., Detroit, Mich., exclusive sales agent for its rotary pump line in the Detroit district. The Stark company specializes in the marketing of pumps and general power plant equipment. It has appointed Vickers & Co., Seattle, Wash., exclusive sales agents in the Seattle district. Hodgart & Co., Chicago, have been appointed exclusive sales agents in the Chicago district.

The Calcos Steel & Iron Co., Philadelphia, has moved its offices to the Weightman Building.

The Seneca Iron & Steel Co., steel sheets, Buffalo, has removed its Detroit offices from the Hammond Building at 2-108 General Motors Building. Harry J. Ward is district sales manager. The New York office has been moved from 30 Church Street to room 1108, Woolworth Building, and is in charge of Henry G. Massey, district sales manager.

The Harrold Tool & Forge Co., Columbiana, Ohio, recently changed its corporate name to the Colonial Tool & Forge Co., manufacturer of mechanics' hand tools, screw drivers and drop forgings. The selling representatives are Wiebusch & Hilger, Ltd., New York.

Lippincott, Mills & Co., Inc., have been established, with offices in the Whitehall Building, 17 Battery Place, New York, telephone Whitehall 0996, and Hippodrome Building, Cleveland, telephone Cherry 61. Business will be transacted in ores, coal, coke, scrap, iron and steel, alloys, and a general importing and exporting business will be conducted. The officers are: G. W. Lippincott, president; W. H. Mills, vice-president and treasurer; A. L. Irwin, vice-president, and P. L. Smith, secretary.

The Progressive Wire Goods Co. has removed to its new plant at Williamstown, N. J. It has purchased a factory building of modern construction, located on the Philadelphia & Reading Railroad and has installed a large modern tinning and galvanizing plant which will give increased facilities for the handling and manufacture of Prowico stationers' wire goods, wire hardware and other specialties in the wire forming and metal stamping field.

The Barbee Steel & Iron Co., Milwaukee, has been organized by Donald C. Barbee to serve as exclusive jobbing representative of the Ludlum Steel Co., Watervliet, N. Y., tool and special steels, in Wisconsin and Minnesota. Mr. Barbee is the owner and president of the Badger Belt & Rubber Co. Both concerns have headquarters and offices at 329 East Water Street, Milwaukee.

The Harriman Industrial Corporation, 542 Fifth Avenue, New York, will assume the duties of sales agent for the Merchant Shipbuilding Corporation, Chester, Pa., for structural and general engineering work.

A. Milne & Co., who formerly represented the FJAB and AMC brands of steel in Canada and the United States, are now the sole representatives of these two brands in North America, Mexico, Central America and South America.

The Upton Machine Co. has moved its general offices from Benton Harbor to St. Joseph and increased its authorized capital from $75,000 to $250,000.

The United Smelting & Aluminum Co., Inc., New Haven, Conn., has appointed Theodore L. Dodd manager for Chicago and surrounding territory. New and enlarged office quarters have been taken in the Railway Exchange Building, 80 East cmfwy etacmfwe ta vbgek ta xzfietaoxzfiiffe t xzfiiffffl flfj Jackson Boulevard, Chicago.

The name of the Crossley Mining Co. has been changed to the United Clay Mines Corporation. It was deemed appropriate to adopt a name which is more descriptive of the firm's position in the clay mining industry. The company deals in clay of all kinds and for every purpose. It is planned to have a warehouse at Trenton, N. J., and a similar storage plant at East Liverpool, Ohio. The company's own ceramic laboratory will be established at Trenton.

J. Earl Myers has resigned as sales manager of the Westmoreland Fuel Co. and has formed a corporation, known as the J. Earl Myers Co., coal and coke, 451-4 Union Arcade Building, Pittsburgh, Pa.

William Swindell & Brothers, Pittsburgh, have established an electric furnace department under the direction of Frank W. Brooke, until recently vice-president and chief engineer Electric Furnace Construction Co., Philadelphia. This department offers the latest design in furnaces for melting steel, gray iron and non-ferrous metals, and also a complete line of electric heating furnaces from 30 kw. upward. A license to operate under the Marsh patents has been granted this firm.

Consolidation of the small tool and drill divisions has been accomplished by the Greenfield Tap & Die Corporation, Greenfield, Mass. P. T. Irvin, formerly manager of the drill division, has been placed in charge of the consolidation, which will be called the small tool division. For the past three years Mr. Irvin has been sales manager of the Lincoln Twist Drill Co. and prior to that was sales manager of Wells Bros. Co., Greenfield.

The Cincinnati Shaper Co. and its subsidiary, the Cincinnati Gear Cutting Machine Co., have arranged for a branch sales office in Indianapolis, with headquarters at 940 Lemcke Annex. T. C. McDonald has been appointed local representative and from this office he will handle all matters pertaining to the use and sale of the machines manufactured by these companies in the Indianapolis and Louisville districts and also cover certain states in the Southwest. Mr. McDonald will also continue as local representative of the Reed-Prentiss Co.

William H. Wilson, secretary and general manager J. E. Moss Iron Works, structural steel, Wheeling, W. Va., has resigned. He will leave Jan. 1 for Los Angeles, Cal., where he will engage in structural steel contracting, specializing in steel joist construction under the style of the Wilson Steel Co.

Plans of New Companies

The Hoffmann Mfg. Co., Paterson, N. J., has been in business for three years, but it only recently incorporated. It manufactures art metal goods of soft white metal.

The Poole-Wetz Mfg. Co., Columbus, Ind., does not contemplate building, as it is already housed, but it may be in the market for additional equipment. It manufactures tools, hardware, etc.

The Electric Draft Heater Corporation, Chicago, Ill., is putting a hot draft auto heater on the market and is having the work done by contract in Chicago.

The Thomas Pump Co., 37 West Van Buren Street, Chicago, was organized to distribute the products of the Aurora Pump & Mfg. Co., Aurora, Ill., in several adjacent states. The company is having several devices manufactured under its name, and does not contemplate doing its own manufacturing.

The Shoppe Flush Valve Co., 10014 Railroad Place, Newark, N. J., was incorporated to take over the partnership business of Frank L. Shoppe, Edward G. Hedges and Walter W. Heroy. Distributing agencies have been established throughout the country.

The Universal Wire Machinery Co. is a New Jersey corporation with its factory located at New Haven, Conn. The company is organized for the purpose of manufacturing wire machinery such as stranders; closing machines for electric conductors and wire rope; bunching machines; cotton wrapping machines; twinning, pairing and tripling machines; taping machinery for taping conductors with paper, varnished cambric or steel tape; saturating equipment for impregnating cables; spooling, winding and reeling equipment; wire drawing machinery for steel wire; continuous copper wire drawing machinery and any special wire machinery designing or building problems. The working organization consists of J. P. Barclay, president and general manager; C. F. Liedke, treasurer and general superintendent; and L. I. Canfield, vice-president and chief engineer. Mr. Barclay formerly served in the capacity of chief engineer of a large wire machinery company. Mr. Liedke has been general superintendent of a wire machinery concern. Mr. Canfield is a designing engineer of 15 years experience on wire machinery.

The Midgley Steel Products Corporation, 30 Church Street, New York, N. Y., has been formed to sell the steel which was recently purchased from the United States Shipping Board. H. F. Midgley is president.

The Detroit Boiler & Welding Co., 2024 E. Atwater Street, Detroit, is specializing in boiler repairs and small tank work. It has a portable welding plant installed on a truck, the welding outfit consisting of a 150-ampere direct-connected Lincoln arc welder and a 6 by 6 direct driven Ingersoll air compressor.

D. & O. G. Heyen, Inc., 126 Atkins Avenue, Brooklyn, which was incorporated on Nov. 1, is engaged in building an improved corrugating ash can machine, fire extinguisher brackets, parts of automobile signal lamps and toy novelties. The company engages in die making, tool making and general machine work. It is capitalized at $75,000. The business was started in 1915. Last spring the present site was acquired, one block from the Long Island Railroad freight station. The new quarters were remodeled and improved extensively.

The Atlas Vise Co, Lowville, N. Y., has been incorporated by Foster M. Stricklan, Champlain, N. Y. E. W. Fulton, G. L. Fulton, Henry Pettie and H. W. Green of Lowville, N. Y. The authorized capital is $25,000 and its purpose is to manufacture, buy, sell, import and export vises and tools of all kinds. The new company has opened executive and sales offices in the Bowen Block, Lowville, N. Y. It has manufacturing and selling rights under patents owned by E. W. Fulton, who was formerly president and general manager of the Fulton Machine & Vise Co., Lowville, as well as similar rights to the trade name and patents of the Velox Vise Co. The company now has under consideration the advisability of securing its own factory for the manufacture of plain types of vises, clamps, etc.

J. P. Van Dyke, inventor of the Van Dyke fountain brush, and John McMillan, an automobile man, have bought the entire capital stock of the Art Hardware & Manufacturing Co., 308 First Avenue, Seattle, and will manufacture brass specialties, including builders' hardware, marine hardware, brass finishing and nickel plating. The manufacture of the fountain brush will constitute a dominant feature.

N. H. Medbury, inventor of an automatic hot-water injector and ranch pump for irrigation, announces plans for the formation at Yakima, Wash., of a half million dollar corporation and the construction of a $100,000 plant for the manufacture of the pump. W. F. Miller is president of the company.

The R. I. V. Co., Inc., 1755 Broadway, New York, is the sole selling agent in the United States for the R. I. V. imported ball bearings, which are manufactured in Italy.

The Baltimore Pipe & Nipple Co., Inc., Baltimore, Md., has been organized to manufacture nipples, bolts and rods and other pipe fittings, but at present it is renting a small place. It expects in about a year or so to be in the market for equipment, if it decides to build.

The Long-Wear Tire & Rubber Co., Anderson, Ind., recently incorporated, is composed of stockholders originally interested in the Quality Tire & Rubber Co., bankrupt, and it is the intention of the stockholders to buy the property of the Quality Tire & Rubber Co. from the creditors. The property has not as yet been taken over and the organizers have no definite plans to give out until they know whether or not the property will be bought.

The Mor-Air Auto Pump Co., Aurora, Ill., will manufacture its products. It is not now in the market for equipment except some minor additions to tool room and punch press departments.

Year of Losses at Youngstown

YOUNGSTOWN, OHIO, Dec. 13.—While 1921 will go down as one of the most unfortunate years in the history of the iron and steel industry in the Mahoning Valley, from the standpoint of operations and earnings, leading executives are confident that better conditions are in store for 1922. Without exception all of the major producers sustained operating losses this year, which has been marked by many distracting influences. The industry has gone through a period of readjustment which waits upon freight rate revisions for completion. Usual seasonal dullness is noticeable at this time of the year, affecting sheets in particular. Inquiries in most finished lines now before the trade are for 1922 delivery.

COST REPORTING CASE

Attorneys for Companies Move to Strike Out Answer of Federal Trade Commission

A motion was filed on Wednesday of the present week in the Supreme Court of the District of Columbia, Washington, by attorneys Levi Cooke and Leo Weil, representing the Claire Furnace Co. and 20 other iron and steel makers, asking the court to strike out the entire amended answer of the Federal Trade Commission in connection with the attempt of the latter to compel the producers to make monthly cost reports to it. Hearing in the case will follow arguments on the motion. The steel interests will seek to make permanent while the commission will attempt to have the court dissolve the temporary injunction restraining the commission from compelling the producers to present their books for the purpose of obtaining cost figures.

Redundant and Argumentative

In the motion, Attorneys Cooke and Weil ask that the amended answer be stricken out for the reason that the commission set forth many alleged presumptions of law. It is further claimed that the amended answer lacks sufficient, specific and separate admissions or details of the material allegations of the bill, or specific and separate material averments of new matter, causing confusion of statement and substance with impertinent, redundant and argumentative matter so as to violate the rules of pleading. Additionally, it is charged that the amended answer tenders issues that were not raised by the bill of complaint and are "confusing, feigned and false both in fact and law," and that the answer sets forth no defense to the bill of complaint. These reasons for striking out the entire amended answer are preceded by requests for eliminating particular portions, which cover all of the main points incorporated in the commission's answer.

May Strike Out Parts

The court is asked, however, if it is of the opinion that the motion to strike out certain of the points on this subject is too broad, it strikes out those portions about it not being necessary for the steel interests to change their form of bookkeeping in order to supply the information; that the commission has issued questionnaires in accordance with law and for uses and purposes expressed; that the action of the commission in demanding answers to orders and questionnaires will be presumed to be constitutional unless the contrary is established by a court of competent jurisdiction; the steel producers cause to be published in trade publications, etc., many of the facts called for.

One of the new and most important paragraphs in the commission's amended answer by inference charged that alleged high prices of steel started the buyers' strike of last year and that steel prices are out of line with prices of agricultural products. The attorneys ask that this paragraph along with others be stricken out because among other things it is argumentative.

LOW PLATE PRICES

Mahoning Valley Mills Compete with the East—Little Sheet Buying

YOUNGSTOWN, O., Dec. 13.—Buying is largely against current requirements. Prices are generally unsatisfactory from producers' standpoint. Some sheet tonnage is being placed for 1922 delivery at the going market of 2.25c. for No. 10 gage blue annealed, 3c. for No. 28 black and 4c. for No. 28 galvanized. Makers are encouraged by the firmness which these quotations are showing. Basic pig iron is pegged for the time being at $19.

Considerable finished steel tonnage is moving to automobile manufacturers, though decline in specifications from this source has had a corresponding weakening effect on the steel market. Sheets, strips, stamped and pressed parts are taken regularly in sizable tonnages by the automobile industry.

Competition From Eastern Plate Mills

While the plate market continues to show more life, prices are still so far out of line that only one interest in the Mahoning Valley is producing merchant plate, the Brier Hill Steel Co. The Youngstown Sheet & Tube Co., which has been out of the market indefinitely, has no intention of re-entering it under present conditions. Plate production of the Republic Iron & Steel Co. consists wholly of material for pipe manufacture. A sales executive states that 1.50c. represents the top and not the bottom of the plate market and that tonnage is being freely placed at this figure. A number of interests which have been regular buyers of plates from Valley producers have been obliged, under these circumstances, to purchase tonnage elsewhere. One of the most striking instances recently involved 20,000 tons of plates sought by a Shenango Valley fabricator which had been a consistent buyer from a Valley maker for many years. An Eastern interest, however, offered to produce the plates at a price which the Valley maker could not touch and for that reason the business went elsewhere. Most of the current inquiry in the plate market emanates from builders of oil storage tanks and from car repair plants.

Sheet buying is sagging and little or no improvement is looked for until after the first of the year, when conditions are expected to show appreciable betterment. Galvanized is probably in most active demand for roofing and construction. Demand for common sheets has fallen off, but several 500-ton lots were placed last week in this district and a number of others involving smaller tonnage. A copper-bearing sheet produced by a Valley interest is meeting with much satisfaction because of its rust-resisting qualities. Formed roofing products are moving in small amounts. A metal furniture interest at Youngstown has placed a sizable order with a Valley maker whose plant is located at Niles for full finished sheets. Sheet production generally shows signs of further weakness.

Operations in the Wheeling District

WHEELING, Dec. 13.—The operating schedule of the Wheeling Steel Corporation calls for the full operation of the pipe furnaces, three butt-weld and two lap-weld, at Benwood, W. Va., this week for the first time this year. The Portsmouth plant of this company is maintaining a gait of more than 50 per cent and the Steubenville works are averaging close to 50 per cent, while the Belmont plant is operating 35 per cent of capacity. Other steel works and rolling mills of the company are idle. Two of its six blast furnaces are making iron.

The American Sheet & Tin Plate Co. units in Wheeling, Martins Ferry and Bridgeport, Ohio, are running close to normal capacity. The Mingo Works, Carnegie Steel Co., has two blast furnaces and a portion of the steel works operating. The Bellaire, Ohio, works of this company and Riverside works of the National Tube Co., Benwood, W. Va., still are down.

Farmers and Manufacturers Will Co-operate

WASHINGTON, Dec. 13.—President James A. Campbell, Youngstown Sheet & Tube Co., has been selected one of seven members of an executive transportation committee for agriculture and industry which was formed here at the conclusion of a meeting last Friday between representatives of agriculture and the basic industrial, construction and fuel industries, the first of the kind ever held. They met with a special committee appointed by railroad executives.

British Iron and Steel Market

Quietness in Steel Still Undisturbed—German Fuel Shortage Hampers Deliveries—Tin Plate and Galvanized and Black Sheets in Fair Demand

(By Cable)

LONDON, ENGLAND, Dec. 13.

There is more inquiry for Cleveland pig iron, but no substantial business is yet moving. Two basic blast furnaces have been transferred to foundry irons. Four additional hematite furnaces are now blowing, but with steel works' demand slow, the iron makers are cutting prices.

Some small demand for foreign ore has developed. Sellers of Bilbao Rubio are asking 27s. ($5.64) ex-ship, Tees. Durham blast furnace coke is obtainable at 28½s. ($5.96) delivered.

While the steel position is still unimproved, there is a fair amount of export inquiry; but steel manufacturers are obliged to make concessions to obtain orders. The home trade buying has lessened. Scotch steelmakers have reduced the price of boiler plates 30s. to £14 10s. (2.71c. per lb.) delivered.

Germany is now complaining of a shortage of fuel supplies, which is held responsible for delays in deliveries. Continental pig iron is consequently dearer. Belgian No. 3 foundry iron is being sold at £4 5s. ($17.76) f.o.b. Sellers are now asking £4 7½s. to £4 15s. ($18.29 to $19.85) f.o.b. for January and February shipment. French Luxemburg basic iron, January and February, is being offered at £4 5s. to £4 6s. ($17.76 to $17.97) f.o.b. Belgian basic iron, also January and February, is held at £4 10c. ($18.81) f.o.b.

German round and square bars are quoted at £8 (1.49c. per lb.) f.o.b., January and February shipment; German merchant bars, £7 15s. (1.45c. per lb.) f.o.b. Belgian and French Luxemburg merchant bars are held at £7 15s. to £8 (1.45c. to 1.49c. per lb.) f.o.b., all for shipment in six to eight weeks. Czecho-Slovakian merchant bars are being sold at £8 (1.49c. per lb.) f.o.b., for shipment in a period from three to five weeks.

French wire rods are quoted up to £9 10s. (1.77c. per lb.) f.o.b., for May delivery. German wire rods are quoted at £8 15s. to £9 (1.63c. to 1.68c. per lb.) f.o.b., for February and March. German wire nails are being sold at 24s. ($5.01) per picul keg ($3.76 per 100 lb. kg.) cost and freight to Japan.

German sheet bars are being done at £6 10s. ($27.17) c.i.f., United Kingdom, for January and February delivery.

Tin plate is easier for prompt shipment. On forced liquidations, speculative purchases of 28 x 20 in. tin plates brought 42s. ($8.78) f.o.b., prompt shipment. There is a fair export demand, and business is being done with Italy and the Near East. Merchants are endeavoring to cover their open position. Quarter wasters at 20¾s. ($4.34) has been done f.o.b., ex-stock. Welsh output is steady at 75 per cent of capacity.

Galvanized sheets are in fair demand, and further sales are on the basis of £17 (3.17c. per lb.) f.o.b. Sellers of Far Eastern specifications of black sheets are getting £18 (3.36c. per lb.) f.o.b., for February and March delivery.

We quote per gross ton, except where otherwise stated, f.o.b. maker's works, with American equivalent figured at $4.18 per £1 as follows:

Durham coke, delivered	£1	8½	to	£1	10		$5.96	to	$6.27
Cleveland No. 1 foundry	5	5	&	5	10*		21.84	&	22.99*
Cleveland No. 3 foundry	5	0	&	5	5*		20.90	&	21.94*
Cleveland No. 4 foundry	4	15					19.85		
Cleveland No. 4 forge	4	10					18.81		
Hematite	7	0*					29.26*		
East Coast mixed	5	2½	&	5	5*		21.42	&	21.94*
Ferromanganese	15	0	&	14	10*		62.70	&	60.61*
Rails, 60 lb. and up	9	0	to	10	10		37.62	to	43.89
Billets	7	5	to	8	5		30.30	to	34.48
Sheet and tin plate bars, Welsh	7	15					32.39		
Tin plate base box	1	0½	to	1	1¼		4.28	to	4.44
							C. per Lb.		
Ship plates	10	10					1.96		
Boiler plates	14	0	to	14	10		2.61	to	2.71
Tees	10	10	to	11	10		1.96	to	2.15
Channels	9	15	to	10	15		1.82	to	2.01
Beams	8	10	to	10	10		1.59	to	1.96
Round bars, ¾ to 3 in.	10	10	to	12	0		1.96	to	2.24
Galvanized sheets, 24 g.	17	0	to	17	5		3.17	to	3.22
Black sheets	14	10	to	15	0		2.71	to	2.80
Steel hoops	12	0	&	12	5*		2.24	&	2.29*
Cold rolled steel strip, 20 g.	24	10					4.57		

*Export price.

Coal Prices Lower—Tin Plate and Galvanized Sheet Markets Bright Spots—Less Continental Competition

LONDON, ENGLAND, Nov. 30.—There has been a noticeable improvement in the coal position and in South Wales especially export demand has broadened. Prices, too, have fallen considerably and supplies are being offered at from 30s. down to 12s. 6d., according to size and quality. These prices are down to less than a quarter of what was being asked a year ago. Some mine owners, however, are only accepting these figures to clear their stocks, and state that then they will close down rather than pay the wages asked.

Recovery in iron and steel continues, though at a slow rate. Cleveland ironmasters have decided to cut prices once more and have dropped quotations 10s. a ton for home and export, except in the case of No. 1 and No. 3 where an export premium is retained of 10s. No. 3 G. M. B., therefore, becomes 100s. for home consumption and 110s. for shipment. Though it is somewhat early to state whether buyers will be attracted, it is noticeable that inquiry has already shown signs of broadening. In the Staffordshire district the production of cold blast pig iron has been resumed but so far no prices for this commodity have been formulated. Continental competition in pig iron is not so keen of late. Prices are lower than ours, but whereas our makers can offer practically prompt delivery, continental makers are still in arrears with the contracts they have already booked. Hematite is fairly steady at 110s. for East Coast mixed numbers both for home and export. The demand is increasing, though only slightly, and four additional furnaces have been put in blast. At the present time the biggest consumer is South Wales, while some odd parcels have been sold for Italy in spite of the adverse exchange rate in that country.

The brightest spots in the finished steel trades are the tin plate and galvanized sheet markets. The turnover in tin plate is good and a recent placing of substantial oil parcels, followed by the securing of Welsh makers of the packing order for British Columbia in face of competition from your side, has been followed by home consumers, who have made some fairly heavy purchases of odd sizes and, in fact, are still showing quite a fair amount of interest. Galvanized sheets are rather slow but most works are pretty well booked on their present output up to January. In other branches a breaking away from the Joint Association for fixing prices of ship plates and shapes by the Scottish works has resulted in a drop in the Scotch quotations, and North Eastern works are endeavoring to get orders from the Scotch districts. More orders are coming in but plants are only partially employed.

Keen competition continues for export business and prices have been cut, £9.15s. f.o.b. having been accepted for a moderate order for ship plates. Far Eastern demand is only meagre, due, no doubt, to the depreciation in the exchange. The Clyde output for November is reported as seven vessels, totalling 15,850 tons, which is the lowest monthly output this year with the exception of January.

In the test data given on the Mezzo drills of the Cleveland Twist Drill Co., Cleveland, page 1336, THE IRON AGE, Nov. 24, the feed per revolution in inches should read 0.032 in.

Machinery Markets and News of the Works

MORE BUYING INTEREST

Further Evidence of Prospective Purchasing of Machine Tools Is Noted

It Is Apparent, However, That a Considerable Part of the Business in Sight Will Be Held Until New Year

While new evidences of buying interest are coming to light almost every day, most of the current activity in machine tools is confined to inquiries and in all probability orders will not be forthcoming, in a majority of instances, until after the first of the year.

The machine-tool trade, however, is well pleased with recent developments, and while there are few who expect a capacity business in 1922, the feeling is general that there will be a marked improvement over the lean months of 1921.

In much of the prospective business, railroad and equipment companies are prominent. The Louisville & Nashville Railroad has taken bids on a list of shop tools, the Rock Island Railroad, the Haskell & Barker Car Co. and the American Locomotive Co. are expected to close shortly on their recent lists. The Erie is buying second-hand tools against its recent inquiry.

Lists of the Illinois Central, Chicago & Northwestern and Burlington roads, which have been expected at Chicago for some weeks, may be held back until it develops whether the Rock Island obtains what the railroads consider satisfactory prices.

Automotive industries show more signs of life. The White Co., Cleveland, will equip about 40 service stations for trucks with repair tools, about four machines to each shop. The Post-Whitney Co., Cleveland, is in the market for 12 to 15 tools, preferably used, for a tractor plant. The General Motors Corporation is expected to close soon on a list of tools for its Dayton, Ohio, laboratories. Among its requirements are 11 turret lathes.

The New York Board of Education has closed for about $60,000 worth of tools for vocational training schools and other business is pending.

The European market does not present many opportunities for American tool manufacturers. France has recently bought German tools quite heavily at prices fully 60 per cent below those quoted on similar American tools. The American Chamber of Commerce in London reports that in Great Britain a market for American tools, once very good, now "scarcely exists."

An order has been placed by an Erie, Pa., company for eight 5-ton cranes.

New York

NEW YORK, Dec. 13.

The New York Board of Education has informally awarded orders for about $60,000 worth of machine tools for vocational training schools. Formal orders will be issued within a few days, or as soon as bids have been checked up to determine whether the proposals carrying the low bids are correct in all details. These purchases will apply against the list on which bids were closed Dec. 6. Proposals will be accepted up to Dec. 16 on another list of more than 100 tools for continuation schools. THE IRON AGE is informed that all orders for machine tools will be placed before Jan. 1 so as to come within the 1921 appropriations. Purchases for schools, including small tools, supplies, etc., will total several hundred thousand dollars, quotations having been received on several different lists.

The Erie Railroad has been buying second-hand tools against its recent inquiry, but other railroads are doing little or nothing. The Merchants Despatch Transportation Co., Rochester, N. Y., has bought several fabricating machines for its car building plant. The American Locomotive Co., New York, has not bought against its recent list, but is expected to do so shortly.

Export business in machine tools shows no marked improvement, but there is a little activity in Japan and other countries of the Far East. In Europe there seems to be little opportunity for American manufacturers to compete with low German prices. Several fairly large lots of German tools have recently been bought by French companies at prices fully 60 per cent below those quoted on similar American tools. The American Chamber of Commerce in London, England, reports that the market in Great Britain for American machine tools, once a very good one, now scarcely exists. A report published after thorough investigation reviews the state of the British machine tool industry and discusses the effect of German competition both in Great Britain and in Europe. Hints as to marketing American machine tools are given, and United States manufacturers are advised to consult the American Chamber of Commerce in London. Copies of the report may be obtained as long as they last by writing to the American Chamber of Commerce, London, England, and referring to THE IRON AGE.

The United States Shipping Board will receive bids up to Dec. 29 at the office of the International Mercantile Marine, New York, on reconditioning of the steamship Leviathan. New York shipyards are figuring on the work, which will require about a year to complete.

The market in cranes continues exceedingly dull and few new inquiries are noted. One of the largest inquiries that has appeared for some time is being handled by J. E. Woodwell, 501 Fifth Avenue, New York, consulting engineer, who is issuing the blue prints and drawings for the locomotive crane to handle 80 tons of coal an hour, an electric overhead traveling crane and ash and coal conveying machinery for a new power plant in Lansing, Mich., noted last week in the Detroit machinery market. A contract including a 15-ton, 33-ft. span hand power crane has been let by the Passaic Valley Sewage Commission to the H. S. Jones Building Co., 280 Madison Avenue, New York. Bids were opened Dec. 9, by the city of Camden, N. J., on a 3-ton, semi-portal, revolving jib crane with a 33-ft. boom. The bids, including generators were as follows: Orton & Steinbrenner, $11,240; Browning & Co., $14,450; Dravo Contracting Co., $15,290; McMyler-Interstate Co., $15,295; Link Belt Co., $16,350, and Heyl & Patterson, $18,100.

Among recent sales are: Industrial Works, a 25-ton, 50-ft. boom locomotive crane to the Pennsylvania Sugar Co., 135 South Second Street, Philadelphia, for use in Florida; Milwaukee Electric Crane & Mfg. Co., a 5-ton, 27-ft. span, overhead traveling crane to the West Penn Power Co., Pittsburgh; Arthur Appleton, 29 Broadway, New York, a 10-ton, 24-ft. span Reading hand power crane to Takata & Co., 50 Church Street, New York, for Japan; Shepard Electric Crane & Hoist Co., a 1-ton, single I-beam crane to the Boynton Furnace Co., Jersey City, N. J., and a 1½-ton, single I-beam crane to the Heckla Iron Works, Brooklyn, N. Y. The Worthington Pump & Machinery Corporation, recently in the market for a 2-ton electric crane of special design, has purchased of Manning, Maxwell & Moore.

The Manhattan Vehicle Co., 518 East Eightieth Street, New York, will make extensions and improvements in its automobile and automobile body manufacturing building, 75 x 100 ft., at 529-33 East Eightieth Street, to cost about $20,000. Peter Damm is president.

The Delaware, Lackawanna & Western Railroad Co., 90 West Street, New York, has asked for preliminary estimates for equipment for the proposed electrification of about

40 miles of road in the vicinity of Scranton, Pa., estimated to cost in excess of $5,000,000. Complete figures and plans are expected to be ready in March.

The State Hospital Commission, Albany, N. Y., is taking bids until Dec. 21, for a new cold storage plant at the Marcy Hospital, Marcy, N. Y.

The H. P. Snyder Mfg. Co., Sixth and West Main streets, Little Falls, N. Y., manufacturer of bicycles and parts, has awarded the contract to Edward K. Fenno, 404 North Berch Street, for a new building, estimated to cost about $110,000. Carl Haug & Sons, Main Street, are architects.

The International Harvester Co., 17 Battery Place, New York, with headquarters at 606 South Michigan Avenue, Chicago, has leased the new factory building just completed at Thirteenth Street and Ely Avenue, Long Island City, for local works.

Conveying equipment, loading and unloading machinery, etc., will be installed in the new building to be erected by the Sterling Salt Co., 29 Broadway, New York, at Cuylerville, N. Y., contract for which has been let to Dwight P. Robinson & Co., 125 East Forty-sixth Street.

The Sterling Tool & Machine Works, 205 West Nineteenth Street, New York, will discontinue business and has arranged for the disposal of its machine shop and equipment to other interests.

The New York Central Railroad Co., Grand Central Terminal, New York, is said to be planning to lease its car repair shops at West Albany, N. Y., similar to the arrangements made for the operation of its shops at East Buffalo and Toledo by private interests. The West Albany shops have been closed for a number of months.

The Bronx Equipment Co., Concord Avenue and 143d Street, New York, has awarded contract to the W. I. Grange Construction Co., 800 Keenan Building, Pittsburgh, for a new two-story and basement plant at Thirty-second Street and Sassafras Alley, Pittsburgh, to cost about $185,000. C. B. Comstock, 110 West Fortieth Street, New York, is architect.

Loading and unloading machinery, conveying equipment, etc., will be installed on the new pier to be constructed at the foot of Forty-fourth Street, North River, plans for which have been completed by the Commissioner of Docks and Ferries, Pier A, North River, New York. It is estimated to cost about $500,000.

A vocational department will be installed in the new high school to be erected at Nutley, N. J., at a cost of $350,000. Starrett & Van Vleck, 8 West Fortieth Street, New York, are architects.

On petition of the Standard Underground Cable Co., Perth Amboy, N. J., the Board of Alderman has passed an ordinance providing for the vacating of property in the vicinity of the plant to permit proposed expansion. A number of buildings will be increased in size, with main cable department, wire works, etc., to have about 100,000 sq. ft. of additional space. The working force will be increased. The work is estimated to cost close to $200,000. C. C. Baldwin is vice-president and general manager.

The Cockburn Corporation, Monmouth Avenue and Twelfth Street, Jersey City, N. J., operating a machine shop, boiler works, foundry, etc., will retire from business and will dispose of the machinery to other interests. The land and buildings have been purchased by the Ault-Wiborg Chemical Co.

The Stanwood Rubber Co., Newark Avenue, Elizabeth, N. J., recently reorganized, will be placed in operation early in January for the manufacture of automobile tires, etc. Machinery will be installed and set up at once. S. P. Woodward is president.

The Weehawken Dry Dock Co., Weehawken, N. J., has leased property on the tidewater basin, Jersey City, N. J., for the construction of a new shipbuilding and repair plant, designed to give employment ultimately to about 2000 men. The plant will cost about $300,000, including machinery. A clause in the lease provides that it shall be void after 36 months if the company has not expended at least $250,000 in plant and improvements. It is said that work on the plant will be commenced at an early date. Richard B. Rodermond is president, and Christopher M. Verdon, vice-president and treasurer.

A vocational department will be installed in the three-story junior high school to be erected at Bergen and Bostwick avenues, Jersey City, N. J. It is estimated to cost about $800,000. Plans are being completed by John T. Rowland, Jr., architect, 100 Sip Avenue.

John Keavey, 375 Palisade Avenue, West Hoboken, N. J., is completing plans and will soon take bids for a one-story automobile service and repair building, 75 x 100 ft., at Palisade Avenue and Malone Street, estimated to cost about $50,000. McDermott & Binda, 582 Bergenline Avenue, are architects.

The Department of Streets and Public Improvements, City Hall, Newark, Thomas L. Raymond, director, is taking bids until Dec. 19, for high pressure fire hydrants, repair parts for valves and hydrants, etc., for the water system.

The Passaic Valley Sewerage Commissioners, 128 Market Street, Newark, will take bids until Jan. 3, for the construction of the superstructure and appurtenances of the Yantacaw Pumping Station, including crane runway, vent stack, electrical work, etc.

A vocational department will be installed in the three-story high school on Lathrup Avenue, Boonton, N. J., now under construction. It will cost about $190,000.

New England

BOSTON, Dec. 12.

The slight spurt in business last week was of short duration. The market has again fallen into a quiet rut, with competition keener than ever. The tendency of the few prospective buyers is to hold off as long as possible before giving an order as it is often found advantageous to do so. Dealers admit their willingness to stretch a point to make a sale is hurting rather than helping the market. Realizing this, manufacturers of tools, in a few instances, are taking a more decided stand regarding prices. In one case the past week an attractive order was assured a manufacturer provided his price was shaded another 10 per cent, but this was flatly refused and the business went elsewhere.

The bulk of orders closed last week was confined to lathes. The inquiry for 10 lathes from a large Massachusetts manufacturer, previously reported, dwindled to eight, the other two being transferred from subsidiary plants. A Brighton, Boston, maker of tools and dies purchased a 16 in. x 8 ft. straight bed lathe with chuck equipment, bench sensitive drill, Cincinnati electric bench grinder and a 20-in. Silver drill press. A local garage purchased a 16-in. x 8-ft. gap bed lathe, and a western Massachusetts manufacturer, a Stark bench lathe with full equipment. A Manchester, Conn., concern closed on a 13-in. x 8-ft. quick change lathe, and a Portland, Me., garage on a 13 in. x 6 ft. lathe. Other sales include an 800-lb. bored drop hammer to a textile machinery maker, pipe machine to another textile equipment interest and a key seater to an Orange, Mass., jobbing shop.

A few live crane prospects are reported, some of which may close before Jan. 1. The American Woolen Co. is said to have closed on a 30-ton Pennsylvania made crane. A better inquiry for hoists is also noted and a few New England foundries are asking for quotations on hand power and jib cranes. In fact, foundry equipment prospects, while not numerous, are more encouraging than in several months. Inquiries include sand blast machines, ladles, and practically everything except cupola and charging equipment, but in this market, as in the machine tool, buyers are shopping. The Union Machine Co., Fitchburg, Mass., has purchased a 10-ton hoist.

The gage business is holding up well, some comparatively good sized orders going to local machine tool houses recently.

Manufacturers of carbon drills have reduced prices 10 per cent, high speed drills 20 per cent, and ratchet and high speed reamers 15 per cent.

The Storms Drop Forging Co., Springfield, Mass., is exceptionally busy. It received an initial order for 1,000,000 tire chain links for pleasure automobiles, and recently was given an additional 12,000,000 link order. It will also start production on a large order for truck tire chain links. Production of tire chain links began on a basis of 10,000 per day, but has been increased to more than 50,000. Schedules call for a further increase to 100,000 per day. The company is figuring on installing three additional hammers, one 1200-lb. and two 5000-lb., bringing the number in operation to 15. Other equipment installed includes oil tempering machinery, tumbling barrels and presses. It is operating 10½-hr. per day, with a full number of employees. The manufacture of tire chains has in no way infringed on the company's regular contract work, of which it has a satisfactory amount on its books.

G. A. Olson, 83 Somerset Street, Springfield, Mass., will erect a 30 x 62 ft. shop and foundry on Page Boulevard.

The Thomas Laughlin Co., 143 Fore Street, Portland, Me., marine hardware, is receiving bids for a one-story, 60 x 60 ft. forge shop.

The Charter Oak Machine Co., recently incorporated to manufacture automobile parts, has secured the co-operation of the Chamber of Commerce, East Hartford, Conn., with the result that a plant, 60 x 100 ft., will be erected at an estimated cost of $30,000 for the company.

The Edison Electric Co., Boston, has purchased additional land adjoining the Weymouth River, Weymouth, Mass., for

a new power station. It now owns sufficient property for the complete equipment of a 300,000-kw. turbine station. Plans will be immediately prepared for the first section, but construction will not begin for some time.

The Southbridge Foundry Co., Inc., Southbridge, Mass., capitalized for $30,000, has been granted a charter with a capital stock of $5,000. Frank S. Mills, 15 Dresser Street, is president, and Arthur A. Allard, 130 Main Street, treasurer.

The Boott Mills, Amory Street, Lowell, Mass., has had plans prepared for a new hydroelectric power plant estimated to cost $40,000. Arthur P. Safford, 66 Broadway, is engineer. F. A. Flather is treasurer.

A. A. Geisel, Pecousic Street, Springfield, Mass., manufacturer of automobile parts, has taken bids for a one-story addition, 40 x 400 ft. E. C. and G. C. Gardner, 33 Lyman Street, are architects.

The Waterbury Ice Corporation, 74 Watertown Avenue, Waterbury, Conn., has acquired property at Walnut and Cherry streets for an ice manufacturing plant.

The Northwestern Expanded Metal Co., Sidney and Henry streets, Cambridge, Mass., has filed plans for a one-story addition to its plant.

The Blackstone Valley Gas & Electric Co., Woonsocket, R. I., has filed plans for a branch power house at Second Avenue and River Street.

Chicago

CHICAGO, Dec. 12.

Aside from prospective railroad business, there is little inquiry in the market and few sales are reported. Orders for individual machines constitute the bulk of current bookings, among the largest being purchases of a No. 2 vertical milling machine and a 4½-in. horizontal boring mill by local users. Much interest is manifested in the Rock Island list published in this column a week ago. There appears to be every prospect that these machines will be placed, unless it develops that the road expects to buy at lower prices than it has represented to the local trade to be satisfactory. The Santa Fe continues to receive revised quotations on its outstanding list, but the other lines, including the Northwestern, the Illinois Central and the Burlington are said to be holding their lists back until they learn the terms under which the Rock Island is able to place its orders.

The Haskell & Barker Car Co., Michigan City, Ind., is expected to close soon for the fabricating equipment listed in this column on Nov. 24, as well as for a number of overhead traveling cranes.

The Aurora Automatic Products Co., 52-56 River Street, Aurora, Ill., has been incorporated with $50,000 capital stock to manufacture automobile accessories, including luggage carriers, radius rods, auxiliary radius rods, sun visors, four point wrenches, tire carriers, brake rods, battery boxes, mufflers, automobile pumps, rear fender brace rods, Ford fans and Ford valves. The new corporation has taken over the assets and business of the Mor-Air Auto Pump Co., and has provided capital for the extension and development of the business carried on by its predecessor. The company will be in the market in the next two or three months for drill presses and also for motors. The officers are: President, V. O. Winkenweder; vice-president, E. Fagan; secretary and treasurer, H. W. Cudding.

The Keenan Boiler Co., Danville, Ill., has let contract for a new plant, 50 x 100 ft., to cost $10,000. This will enable the company to conduct all its operations under one roof, whereas it is now using two buildings on Griggs Street.

Harry E. Bartlett, formerly vice-president Ampco Metal Products Co., Springfield, Mo., has purchased from that company the foundry patterns, equipment and materials, and is doing jobbing work in a part of the Ampco Building. The Ampco company will confine its operations to the making of stove pipes and metal fence posts.

John B. Foote, of the Foote Brothers Gear & Machine Co., 213 North Curtis Street, Chicago, has purchased 35 acres at the southwest corner of Sixty-fifth Street and Keeler Avenue.

Joseph M. Mrazek, 1239 South Tripp Avenue, Chicago, is preparing plans for a two-story reinforced concrete factory with 120-ft. front and two wings 900 ft. deep, at Seventy-seventh Street, Western Avenue and the Baltimore & Ohio tracks, for the Morand Cushion Wheel Co., Joseph L. Morand, president, 818-32 South May Street. The project, which is now being financed, is expected to cost $500,000, and work is scheduled to begin next spring.

Charles W. Kallal, city architect, City Hall, Chicago, is preparing plans for a two-story pumping station near Western Avenue and Forty-third Street, to cost about $3,165,000. Work is scheduled to begin when an appropriation is made next year.

The Dental Metal Products Co., Chicago, has had plans drawn by Ralph H. Oliver, 115 South Dearborn Street, for a two-story factory, 42 x 71 ft., and warehouse, 28 x 42 ft., for manufacturing metal products. The plant will be located at 7512-18 Greenwood Avenue and will cost $30,000.

The Cuneo-Henneberry Co., 455 West Twenty-second Street, Chicago, has let contracts for a six-story printing plant, 122 x 221 ft., at 2242-54 Grove Street, to be used exclusively for printing Western editions of the *Saturday Evening Post*.

Holton, Seelye & Co., contractors, 140 South Dearborn Street, Chicago, will construct a one-story factory, 106 x 175 ft., to manufacture sheet metal advertising specialties, to cost $20,000.

The Story & Clark Piano Co., Grand Haven, Mich., plans to erect a one-story power house.

The N. W. Race Mfg. Co., Billings, Mont., plans to construct a factory for the manufacture of steam specialties, to cost $50,000.

The Crane Co., 836 South Michigan Avenue, Chicago, has plans under way for a two-story foundry, 160 x 500 ft., at 4100 Kedzie Avenue, estimated to cost $800,000. Graham, Anderson, Probst & White, 8 East Jackson Boulevard, are architects.

A vocational department will be installed in the three-story and basement junior high school to be erected at Twenty-fifth and Nebraska streets, Sioux City, Iowa, estimated to cost about $350,000. It will be 120 x 230 ft. Beutler & Arnold, 235 Grain Exchange Building, are architects.

The Elgin Watch Co., 10 South Wabash Avenue, Chicago, has awarded a contract to Charles E. Gertz & Son, Elgin, Ill., for additions to its Elgin plant, estimated to cost close to $1,000,000, including equipment. Charles H. Hulburd is president.

Oven equipment, power apparatus, conveying machinery and other equipment will be installed in the three-story plant to be erected by the Vienna Model Bakery, 1040 Vernon Park Avenue, Chicago, estimated to cost $150,000.

The Wyoming Refining Co., Midwest Building, Casper, Wyo., has acquired over 300 acres near Casper, to be used in part for the erection of a new refinery, with initial daily capacity of about 7000 bbl., and to be increased at a later date to about 20,000 bbls. A pipe line to the Salt Creek oil fields, about 40 miles distant, will also be constructed. The entire project is estimated to cost in excess of $3,000,000. W. A. Blackmore is president.

Savage & Whitney, 914 Pioneer Building, St. Paul, Minn., are planning the construction of additions to their power plants at Devil's Lake, Oakes and Enderlin, N. D., with the installation of new machinery. Work will commence early in the spring. A. H. Savage is head.

The Omaha Semi-Steel Foundry Co., 1409 Jackson Street, Omaha, Neb., has awarded contract to the Peter Kiewits Sons Co., 754 Omaha National Bank Building, for a one and two-story foundry, 60 x 100 ft., at Eleventh and Grace streets, estimated to cost about $15,000, exclusive of equipment.

The Morand Cushion Wheel Co., 818 South May Street, Chicago, manufacturer of automobile wheels, will soon call for bids for the erection of a two-story plant at Western Avenue and Seventy-seventh Street, estimated to cost $500,000, including machinery.

Buffalo

BUFFALO, Dec. 12.

Fire, Dec. 6, destroyed a portion of the foundry of the Pratt & Letchworth Co., 189 Tonawanda Street, Buffalo, manufacturer of iron and steel castings, etc., with loss estimated at about $15,000.

The Federal Ice & Refrigerator Co., 76 West Monroe Street, Chicago, has completed plans for a one-story ice-manufacturing plant at Buffalo, 160 x 300 ft.

The Karge-Baker Corporation, Phoenix, N. Y., manufacturer of flexible couplings, transmission equipment, etc., has removed its plant to 658 Ellicott Street, Buffalo, for increased operations.

Charles L. Cadle, Superintendent of Public Works, Albany, N. Y., will receive bids until Jan. 4, for furnishing and installing two 2-ton electric overhead traveling cranes for service on the barge canal terminal at Rochester, N. Y.

The Buffalo, Rochester & Pittsburgh Railroad Co., Rochester, has preliminary plans under way for a new repair shop, probably at Rikers, near Punxsutawney, Pa.

The Merchants Dispatch Transportation Co., East

Rochester, N. Y., will build a one-story addition to its steel fabricating plant, 80 x 560 ft. L. F. West is head.

A vocational department will be installed in the two-story and basement high school, 80 x 150 ft., to be erected by the Board of Education, Syracuse, at Solvay, N. Y. M. L. King, Snow Building, is architect.

Louis Gaband, 1352 East Main Street, Rochester, N. Y., has revised plans under way for a one-story automobile service and repair building, 35 x 145 ft., on Franklin Street. Hutchison & Strutz, Cutler Building, are architects.

The Triumph Motor Truck Co., Medina, N. Y., manufacturer of assembled motor trucks, has acquired property at DuBois, Pa., for a second plant, to be operated in conjunction with the Medina works. Plans will be prepared at once and it is expected to have the works ready for service early in the year.

The storehouse of the Mayer Coating Machine Co., containing machinery, patterns and other equipment, was destroyed by fire on Dec. 8, the loss amounting to $25,000.

The William H. Wilson Iron Works, 551 Lyell Avenue, Rochester, N. Y., which recently suffered a severe loss by fire, will be in the market soon to replace equipment that was destroyed or damaged.

Pittsburgh

PITTSBURGH, Dec. 12.

Machine tool business the past week has been fairly good with some but extremely quiet with others. One company reports the sale of four squaring shears to a sheet metal shop outside of Pittsburgh and two Fay & Egan wood-working machines to a Pittsburgh buyer. Another dealer took an order for a number of presses for the Wheeling Steel Corporation. The Pittsburgh Valve Foundry & Construction Co., Pittsburgh, which is erecting an addition, last week closed for a 5-ton, 55-ft. 8-in. span overhead traveling crane with the Champion Engineering Co., Kent, Ohio, and is expected to close shortly for a large face grinder. The crane market does not show much activity in sales, but requests for revised quotations against old projects are coming in daily and occasional new inquiries are received. The Erie Malleable Iron Co., Erie, Pa., recently closed for eight 5-ton, 40-ft. span cranes, the business going to the Erie Steel Construction Co., Erie, Pa. Max Solomon, scrap iron and steel, Oliver Building, Pittsburgh, is seeking one 25-ton locomotive crane for his new yard at Wheatland, Pa., and not two 25-ton overhead cranes as previously reported. It has been learned that the recent inquiry for a 75-ton crane from an undisclosed buyer is for a 50-ton overhead with 10-ton auxiliary, but the identity of the prospective purchaser still is withheld.

The Jones & Laughlin Steel Co. recently closed with the Worthington Pump & Machinery Corporation for a 60 x 48-in. jaw crusher for its ore mining subsidiary, the Interstate Iron Co.

The Pittsburgh Malleable Iron Co., Pittsburgh, advises that it does not contemplate erecting a plant in Ellwood City, Pa., as previously stated.

The American Gas & Electric Co., 30 Church Street, New York, has plans under way for the erection of its new electric power plant at Wellsburg, W. Va. Sargent & Lundy, 72 West Adams Street, Chicago, are architects and engineers.

A vocational department will be installed in the two-story and basement high school, 60 x 190 ft., to be erected at Princeton, W. Va., estimated to cost $150,000. Wysong & Jones, Charleston, W. Va., are architects.

Mechanical blowing equipment, fitters, crimpers, pipes, etc., will be installed in the new plant to be established by the Salem Flint Glass Co., Salem, W. Va., recently organized. R. F. Davis is president, and J. O. Burkhart, manager.

The Highway Department, Beckley, W. Va., has been directed to erect a garage, service and repair building for county automobiles, trucks and road-building equipment.

A vocational department will be installed in the two-story and basement high school, 60 x 218 ft., to be erected at Charleston, W. Va., estimated to cost $125,000. H. Russ Warner, Masonic Building, is architect. Bids will be asked for in January.

The Frick & Lindsay Co., Sandusky and Robinson streets, Pittsburgh, manufacturer of railroad and mine equipment, etc., has filed plans for a brick and steel addition, estimated to cost $90,000.

Bids are being taken by the Board of Education, Pittsburgh, for the Samuel P. Langley high school at Chartiers and Hutton avenues, to include a vocational department. It will be two-stories and basement, 87 x 300 ft., estimated to cost $500,000. McClure & Spahr, Keystone Building, are architects.

The Robert Talbott Coal Co., Lowsville, W. Va., will install new loading, conveying and other equipment at its plant.

The International Harvester Co., 606 South Michigan Avenue, Chicago, has awarded contract to Plate & Vogel, Parkersburg, W. Va., for a two-story and basement addition to its Parkersburg works, 45 x 75 ft.

Cincinnati

CINCINNATI, Dec. 12.

Local manufacturers of machine tools are well pleased with recent developments, and as a result are more optimistic than for nearly a year. Inquiries are coming in steadily for one and two machines with the total fairly large. What lends more encouragement to the situation is that inquiries are from bona fide buyers, some of whom have not been active for many months. It is not expected that much buying will develop this year, but prospects for the early months of the new year are good. The Louisville & Nashville Railroad closed bids last week on a sizable list of tools, and it is expected that purchases will be made shortly. The General Motors Corporation is also expected to close soon on tools for its Dayton laboratories, 11 turret lathes being on the list. With hardly an exception, orders booked the past week were for single machines, but the number was slightly in excess of the previous week, making it one of the best for many months.

The Oakley Machine Tool Co., manufacturer of tool grinders, has moved its office and plant from Cincinnati to Middletown, Ohio, where it has taken over part of the works occupied by the Willard-Middletown Machine Co. The greater part of the equipment has been installed and manufacturing operations are under way.

The Studebaker-Wulff Co., a reorganization of the Rotary Tire & Rubber Co., Zanesville, Ohio, has been formed to manufacture tires. It is expected that production will start about the first of the year. Temporary offices of the company have been established at 66 East Broad Street, Columbus, Ohio. Peter E. Studebaker is president.

The Advance Foundry Co., Dayton, Ohio, is in the market for a second-hand 24-in. tumbler in good condition.

Baltimore

BALTIMORE, Dec. 12.

The McHenry-Millhouse Co., South Bend, Ind., manufacturer of roofing products, has awarded contract to the Hydraulic Steelcraft Co., Hydraulic Avenue, Cleveland, for a one-story addition to the plant of the Electrolytic Zinc Co., Second Avenue and South Sixteenth Street, Baltimore, recently acquired, 70 x 100 ft. J. L. Kittinger is general manager.

Electric cranes, loading and unloading machinery and other equipment will be installed on the proposed new railroad piers to be constructed by the Western Maryland Railroad Co. and the Port Development Commission, Baltimore. Two piers will be built at a cost of $10,000,000.

Thomas E. Waggaman and J. Edgar Leonard, Easton, Md., have acquired the plant of the Easton Ice Co. and have organized the People's Ice Co., to operate the property. Plans are under way for remodeling the building and the installation of new ice-making machinery.

V. G. Eisel, 2306 Reisterstown Road, Baltimore, is organizing a company for the establishment of a plant to manufacture automobiles and equipment.

The Irvington Ice Co., care of Joseph Stienacker, 28 Sanford Road, Catonsville, Md., architect, has preliminary plans in progress for a one-story ice plant at Irvington, near Baltimore, to cost about $25,000.

The Hagerstown & Frederick Railway Co., Hagerstown, Md., has preliminary plans under consideration for a new electric generating plant at Confluence, Pa., with initial capacity of about 40,000 kw. The project will be held in abeyance for a number of months, with details of equipment and operation developed in the meantime. The entire plant and transmission system is estimated to cost $1,000,000.

The Easton Utilities Commission, Easton, Md., is planning for the installation of a new turbine, engine and auxiliary electric equipment at the city power plant.

The White Garage Co., Dillon, S. C., is planning to rebuild its machine and repair shop, recently destroyed by fire.

A vocational department will be installed in the junior high school to be erected at Richmond, Va., estimated to cost $341,000. Charles M. Robinson, Times-Dispatch Building, is architect. C. P. Walford, 802 East Marshall Street, is superintendent of the board.

Vocational departments will be installed in the two new

high schools to be erected next year by the Board of Education, Baltimore, Henry S. West, superintendent. Each building is estimated to cost about $500,000. Plans are being prepared by Parker, Thomas & Rice, Union Trust Building, and Smith & May, Calvert Building, architects.

Fire, Nov. 30, destroyed the mill of the Wentworth Lumber Co., Savannah, Ga., with loss estimated at about $225,000, including machinery.

The Heaton Coal Co., Tacoma, Va., will install electric motors and other equipment at its properties.

The Crystal Ice & Transfer Co., North Avenue and Chester Street, Baltimore, has plans under way for a two-story addition to its automobile service and repair building, 80 x 180 ft., estimated to cost about $30,000.

Detroit

DETROIT, Dec. 12.

The Signal Motor Truck Co., Detroit, has been reorganized and will continue to manufacture trucks under the name of the Signal Motor Corporation. The officers are: President and treasurer, M. B. Hoagland; vice-president, H. S. Sternberg; secretary, H. H. Emmons, and assistant treasurer, J. C. Dibsball.

C. H. Wills & Co., Marysville, Mich., have taken over the branch plant in Marysville of the Illinois Tool Co., which has been devoted exclusively to the manufacture of steering gears, speedometer drives and accessories for the Wills company. No changes except in personnel will be made.

The City Commission, Battle Creek, Mich., has authorized the preparation of plans and estimates for a new municipal electric light and power plant to be submitted next spring.

The Port Huron Sulphite & Paper Co., Port Huron, Mich., has let contract for an addition, 70 x 100 ft.

The Tirrell Mfg. Co., Bridgman, Mich., recently organized to manufacture nozzles, air pumps, rotary water pumps and other power spraying machinery, has completed its plant and production is under way. L. L. Tirrell is president.

The Aetna Portland Cement Co. will erect a new plant at Bay City, Mich., on a site of 33 acres, to cost more than $1,000,000. The first unit will be started in the spring. The administration offices, repair shops, laboratories and garage will be erected south of the main plant at a cost of $750,000. The general offices of the company are in the Union Trust Building, Detroit, with O. J. Lingeman, secretary-treasurer and general manager in charge. Edmund M. Bunce, now manager of the Fenton plant will take charge of the Bay City works.

A one-story power house will be erected in connection with the new school in the Oak Grove district, Flint, Mich., bids for which are being received until Dec. 28. Malcomson, Higginbotham & Palmer, 409 Flint P. Smith Building, Flint, are architects. A. J. Wildanger is secretary of the Board of Education.

The Washtenaw Auto Sales Co., Detroit, has tentative plans under way for a one-story service and repair building, 60 x 180 ft., to cost about $65,000. Cuthbert & Cuthbert, 327 East Huron Street, are architects.

Fire, Nov. 29, destroyed the tipple and other equipment at the Beaver mine of the Robert Gage Coal Co., Bay City, Mich., with loss estimated at about $50,000. It will be rebuilt.

Cleveland

CLEVELAND, Dec. 12.

Dealers' inquiries are largely for small machines, but in most cases orders against these will not be placed until after the first of the year. The only inquiry of any size is from the Post-Whitney Co., Society for Savings Building, Cleveland, for 12 to 15 machines, mostly second hand, for equipping a tractor plant. The White Co., Cleveland, is inquiring for machinery for fitting up motor truck service stations. The equipment of these stations will include an 18-in. geared head engine lathe, tool post grinder, sensitive drill and arbor press. It is stated that the company plans eventually to equip 40 stations. Local manufacturers are working on an inquiry for five turret lathes, included in the list recently issued by the Rock Island Railroad.

The amount of used machinery offered in this section is greater than ever before, according to local dealers. In addition to 1500 or more machines being placed on the Detroit market by the General Motors Corporation, large quantities of used machinery in various sized lots are being offered by other interests anxious to dispose of surplus equipment and have taken the end of the year before inventory time, to place it on the market.

Crane manufacturers report some improvement both in inquiries and in orders. The largest crane order placed for some time was awarded the past week by the Erie Malleable Iron Co., Erie, Pa., for eight 5-ton electric traveling cranes.

Plans for the re-organization of the Spencer Metal Products Co., Medina, Ohio, have been worked out and tentatively accepted by the creditors' committee and will be submitted to the stockholders. The company is now in the hands of John P. Childes, receiver.

The Massillon Wire Basket Co., Massillon, Ohio, has commenced the erection of a plant to manufacture wire baskets and crates.

The Lima Woolen Mills, Inc., Lima, Ohio, will shortly begin the erection of a foundry and power plant.

The Wilton Tool Co., now operating a foundry in Detroit, will erect a new plant in Sharon, Pa., for the manufacture of gage blocks, measuring and precision tools and cutting tools. Tentative plans provide for a building 100 x 150 ft.

The Cyclone Drilling Co., Orrville, Ohio, manufacturer of mechanical drilling equipment, will soon commence the erection of a one-story addition to cost about $70,000.

The Jeannin Electric Co., 110 Eleventh Street, Toledo, Ohio, manufacturer of electrical products, has acquired property for the erection of a new one-story plant, estimated to cost $25,000.

The Cree-Becker Oil Tool Co., Essex and Indiana streets, Newark, Ohio, manufacturer of oil tools, is operating at capacity and is preparing to install a considerable amount of new machinery. It is particularly in need of a milling machine and drill press.

Philadelphia

PHILADELPHIA, Dec. 12.

The Lyster Body Co., 330 North Fifth Street, Philadelphia, manufacturer of automobile bodies, has acquired the four-story factory at 408-14 North Randolph Street, 58 x 85 ft., and the one-story building at 407-11 North Randolph Street, for a new plant.

Plans for the erection of a one-story machine shop addition have been filed by the Hulton Dyeing Co., 3819 Frankford Street, Philadelphia. The building contract has been let to F. Crompton & Brother, 4614 Oakland Street.

The Velie Sales Co., 29 West Harvey Street, Germantown, Philadelphia, is taking bids up to Dec. 20, for a one-story automobile service and repair works, 50 x 105 ft., estimated to cost $60,000.

J. M. White, 1116 Olive Street, Philadelphia, operating a wire and wire brading works, is planning the erection of a two-story and basement addition, 60 x 95 ft., at 1124-32 Olive Street, estimated to cost $25,000.

Christopher Offenhouser, 3430 Powelton Street, Philadelphia, has filed plans for an addition to his machine shop at Wensley and Allen streets.

The Howe Scale Co., 806 Arch Street, Philadelphia, has leased the entire five-story and basement building, 21 x 140 ft., at 415 Arch Street, for local headquarters. Improvements and alterations will be made.

The Fanning-Schuett Engineering Co., 502 Ruscomb Street, Philadelphia, manufacturer of engineering specialties, has taken title to property on Third Street, 90 x 120 ft., for a one-story machine and engineering works. Plans for the building have been prepared.

Morganthaler Brothers, Second and Snyder streets, Philadelphia, ice manufacturers, have awarded contract to the William F. Koelle Co., Twenty-sixth and Oxfords streets, for a two-story addition, 60 x 100 ft., on Philip Street, to cost $12,000.

The Lower Paxton Township School Board, Paxton Township, Pa., will soon commence the erection of a one-story vocational school near Livingston, to cost about $50,000. The contract has been let to J. Frank Saussman, Paxton, Pa. Frank G. Fahnestock, Patriot Building, Harrisburg, Pa., is architect. John Swartz is president of the board.

Fire, Dec. 7, destroyed a portion of the plant of the Sheldon Axle Works, Wilkes-Barre, Pa., manufacturer of automobile axles, with loss estimated at about $75,000. The forge shop was practically ruined. The company is a subsidiary of the Spicer Mfg. Co., Plainfield, N. J.

The Delaware Seamless Tube Co., Aub..n, Pa., will soon commence the erection of the superstructure for a new building at its plant.

A vocational department will be installed in the new high school to be erected at Mercerburg, Pa., the first unit of which is now under way. Hirsch & Sheller, Chamber of Commerce Building, Altoona, Pa., are architects.

The Ohio Generator Co., Red Lion, Pa., has been chartered under State laws to manufacture isolated electric power plant equipment, etc. A site has been selected and plans are nearing completion for a four-story factory, 65 x 110 ft. Joseph Dise, Glen Rock, Pa., is architect. Clayton C. Meads is treasurer.

The Consumers' Auto Supply Co., 375 Bennett Street, Luzerne, Pa., has awarded contract to William Whitebell, 91 Goodwin Street, Kingston, Pa., for a one-story automobile service and repair building, 70 x 130 ft., estimated to cost about $50,000.

A vocational department will be installed in the three-story and basement junior high school to be erected at Thirteenth and Marion streets, Reading, Pa.

The Chamber of Commerce, Carlisle, Pa., is negotiating with the Champion Motor Co., represented by Henry Crowthers, Philadelphia, relative to a site for the establishment of an automobile assembling plant, primarily for export trade.

The Harrisburg Stanley Spring Co., Harrisburg, Pa., has filed plans for a one-story factory, 50 x 100 ft., at Cameron and Calder streets, for the manufacture of special self-oiling springs. Harry D. Delmotte, Twelfth and Herr streets, secretary, is in charge.

Milwaukee

MILWAUKEE, Dec. 12.

Supplementing the improvement noticeable in the machine-tool market the last four to six weeks, more evidence of renewed buying is coming to light. The prospect of an active demand from railroads is probably the most encouraging feature. Milling machine manufacturers report better business, although the automotive industries are engaged in the annual inventory and buying practically nothing beyond necessities. This is housecleaning time for most industries and it is expected that while it will result in the offering of considerable used equipment, requirements of new tools will be broader after Jan. 1.

The Clarkson Coal & Dock Co., Superior, Wis., will build a two-story brick and concrete office and machine shop, 64 x 100 ft. It will require considerable miscellaneous equipment, which, however, will not be purchased until early next spring. R. C. Buck, Superior, is architect. J. J. Davidson is general superintendent.

The Western Malleables Co., Beaver Dam, Wis., has let the general contract to the Austin Co., Cleveland, for a one-story factory and warehouse addition, 40 x 120 ft.

The National Brass Co., Milwaukee, has been incorporated with a capital stock of $10,000 and proposes to establish a brass and aluminum foundry in leased quarters. The incorporators are John Jacoby, president, and Paul Daehling, secretary-treasurer Jacoby & Daehling, Ltd., pattern manufacturer, 758-760 South Pierce Street, and William N. Leininger, 888 Thirty-third Street, formerly superintendent of the Milwaukee Die Casting Co.

The Chippewa Wood Mfg. Co., Chippewa Falls, Wis., recently incorporated, has taken over the plant and business of the Northern States Casket Co. in the same city and will start work at once on a two-story brick and concrete addition, 32 x 76 ft., estimated to cost $30,000 with equipment. F. Sterzik is president and general manager.

The Cudahy Brothers Co., Cudahy, suburb of Milwaukee, will build a new box and crating factory, 80 x 190 ft., one-story, of brick and concrete, to replace the plant destroyed by fire recently. E. F. Lawler is general manager.

The Bailey-Shippert Mfg. Co., Milwaukee, has been incorporated with a capital stock of $25,000 by George Bailey, 600 Murray Avenue; O. C. Weber and Lyman G. Wheeler, attorney, 78 Loan and Trust Building, Milwaukee. It intends to manufacture automatic milling machinery and similar dairy appliances and devices, but no definite details are now ready for publication.

The Board of Education, Eagle River, Wis., expects to take bids about Jan. 15 for the construction and equipment of a new high school, with vocational training departments. It will be two-stories and basement, 76 x 115 ft., and was designed by Parkinson & Dockendorff, architects, LaCrosse, Wis. The cost is estimated at $125,000. Charles Adams is secretary of the board.

The George J. Meyer Mfg. Co., 576-598 Clinton Street, Milwaukee, has let the general contract to Charles B. Danielson, 638 Mineral Street, for a brick and steel addition, 60 x 100 ft., two stories, to its machine shop. The concern manufactures bottling machinery and conducts a jobbing machine shop business. George J. Meyer is president.

The Board of Education, Oregon, Wis., has engaged Edward B. Tough, architect, Madison, Wis., to design a new high and vocational training school, 85 x 120 ft., two stories and basement, estimated to cost $100,000. Bids will be taken Feb. 1. E. F. Kramer is secretary of the board.

Indiana

INDIANAPOLIS, Dec. 12.

F. R. Chandler, 3817 North Pennsylvania Street, Indianapolis, has plans under way for a five-story automobile service and repair building, 60 x 200 ft., estimated to cost in excess of $200,000. Vonnegut, Bohn & Mueller, Indiana Trust Building, are architects.

The Indiana Power Co., Vincennes, Ind., has arranged for a bond issue of $1,100,000, the proceeds to be used for general operations, extensions in plants and system, etc. It has completed a new plant at Edwardsport, costing about $500,000.

The Studebaker Corporation, South Bend, Ind., is arranging to manufacture closed and other bodies for its cars and will remodel plant No. 1, heretofore devoted to wagon manufacture for this purpose.

The Pennsylvania Lines West of Pittsburgh, Union Station, Pittsburgh, have awarded contract to the Dwight P. Robinson Co., 125 East Forty-sixth Street, New York, for a two-story machine and boiler shop at Fort Wayne, Ind., to cost about $400,000. It is said that construction will be held in abeyance until after the first of the year.

A one-story power house will be erected by the Mutual Milk Co., Bethel Avenue and Minnesota Street, Indianapolis, in connection with the construction of an addition.

D. M. Crawford, head of the Crawford-McCrimmon Machine Co., Brazil, Ind., is interested in a company being formed at Terre Haute, Ind., to manufacture a safety device for air drills, air hammers, etc., to be known as the Hicks-Crawford safety device.

George Tucker, Evansville, Ind., has leased a building at Shelbyville, Ind., which will be used as a machine and woodworking shop after the first of the year.

J. W. Johnson, Kokomo, Ind., and C. T. Byrne, Chicago, have bought the Liberty Pressed Metal Co., Kokomo, from the Federal trustee for $65,000.

The Central South

ST. LOUIS, Dec. 12.

The Polar Wave Ice & Fuel Co., Grand and Olive streets, St. Louis, has awarded a contract to the Fruin & Colnon Construction Co., Merchants Laclede Building, for a two-story ice-manufacturing plant.

A vocational department will be installed in the three-story high school, 78 x 125 ft., to be erected at Humboldt, Kan., and estimated to cost about $125,000. T. W. Williamson & Co., 312 Central National Bank Building, Topeka, Kan., are architects.

The Missouri, Kansas & Texas Railroad Co., Railway Exchange Building, St. Louis, has awarded contract to T. H. Johnson, South Ohio Street, Sedalia, Mo., for a new one-story machine shop at Parsons, Kan., estimated to cost $50,000.

Fire, Dec. 5, destroyed the plant of the Greenwood Compress & Storage Co., Greenwood, Miss., with loss estimated at about $700,000, including building, machinery and stock.

A vocational department will be installed in the two-story and basement high school to be erected at Lawrence, Kan., 120 x 210 ft., estimated to cost close to $500,000. Work will commence at an early date.

The Arctic Ice Co., 205 Lee Building, Kansas City, Mo., A. L. Williams, head, is planning the erection of a two-story factory at Second and Delaware streets.

The Muskogee Vitrified Brick Co., Muskogee, Okla., is planning to rebuild the portion of its plant recently destroyed by fire with loss estimated at about $50,000, including equipment.

The White Eagle Oil & Refining Co., 418 Dwight Building, Kansas City, Mo., has plans under way for a new three-story oil refinery at Armourdale, Kan.

The Western Tie & Timber Co., 915 Olive Street, St. Louis, is completing plans for its new hydroelectric generating plant on the Current River, near Eminence, Mo.

The Thirty-Six Coal Mining Co., Branch, Ark., is planning the installation of electrical and other machinery at its property, estimated to cost about $30,000. Allen Pinkerton is president and manager.

The War Department, Washington, will build a new aeroplane hangar, with repair shops and mechanical depart-

ment, on the Scott Field, near St. Louis, estimated to cost close to $1,000,000.

The Standard Sanitary Mfg. Co., Pittsburgh, Pa., has plans nearing completion for a one-story addition at Sixth and A streets, Louisville, 56 x 375 ft., estimated to cost about $100,000. O. P. Ward, Lincoln Building, Louisville, is architect.

The Welborn Corporation, Kansas City, recently organized as the Welborn Tractor Co., with capital of $4,000,000, has acquired the plant and business of the Coleman Tractor Co. Operations will be continued at the works under the new name. F. I. Welborn is president, and A. Coleman, secretary.

The Missouri Utilities Co., Mexico, Mo., is planning for extensions and improvements in its local electric power plant to cost about $25,000.

A vocational department will be installed in the two-story and basement high school, 64 x 170 ft., at Peabody, Kan., estimated to cost about $150,000. It is expected to call for bids early in the coming year. Mann & Gerow, Hutchinson, Kan., are architects. W. P. Reese is superintendent of schools.

The Fort Smith Compress Co., Fort Smith, Ark., has plans under way for a new plant, 200 x 400 ft., to replace its works recently destroyed by fire with loss reported at $500,000, including machinery and stock. E. F. Creekmore is vice-president.

The Standard Brake Shoe & Foundry Co., Pine Bluff, Ark., is contemplating extensions and improvements in its plant to double, approximately, the present output.

The new one-story and basement plant to be erected by C. M. Byrd, 2319 South Ohio Street, Sedalia, Mo., will be used for the manufacture of lawn mowers and similar products. Plans will be prepared at an early date.

The United Railway Co., Thirty-ninth Street and Park Avenue, St. Louis, will defer the erection of its new three-story car repair plant, to cost about $150,000, until early in the spring. The main works will be 80 x 208 ft., with adjoining structure, 60 x 72 ft.

The Producers' & Refiners' Corporation, Tulsa, Okla., is arranging for enlargements in its oil refinery at West Tulsa, to include the installation of a wax lubricating and grease manufacturing plant.

The Gulf States

BIRMINGHAM, Dec. 12.

The American Automotive School, Main and Haskell streets, Dallas, Tex., has plans under way for a one and three-story building, estimated to cost about $150,000. The one-story portion, 75 x 92 ft., will be equipped as a school and shop. J. A. Pitzinger, Dallas, is architect.

The Prairie Pipe Line Co., Mertens, Tex., has acquired about 15 acres of land for a new electrically-operated pumping plant, estimated to cost about $100,000, including machinery.

The Alexandria Refining Co., Alexandria, La., recently organized, has perfected plans for a new refinery. E. M. Talley is manager.

The Standard Oil Co. of Louisiana, New Orleans, is planning for extensions in its plant at Baton Rouge, La., including additional storage facilities to provide for 1,000,000 barrels of oil. Steel tanks will be used for the latter service. The company is said to be negotiating for the purchase of the plant of the Export Oil Corporation at Avondale for a consideration of about $950,000.

H. D. Dean, Tuscaloosa, Ala., manufacturer of shuttle blocks and kindred equipment, has acquired property at Brewtoh, Ala., for a new plant to manufacture similar products.

The Texas Utilities Co., Plainview, Tex., has tentative plans under consideration for rebuilding its electric power and ice-manufacturing plants at Lubbock, Tex., recently destroyed by fire with loss of about $100,000. H. Wurdack is president, and H. C. Randolph, vice-president.

The Double Seal Ring Co., Fort Worth, Tex., manufacturer of piston rings, has arranged for a bond issue of $600,000, the proceeds to be used for general operations, extensions, etc. The company is planning to manufacture a new automotive invention, to be known as the double seal kerofier.

The St. Andrews Bay Machine & Garage Co., Panama City, Fla., recently organized, has plans under way for three buildings for automobile and marine engine machine and repair work, 30 x 60 ft., 30 x 50 ft. and 20 x 60 ft., respectively. J. T. Stansel is secretary.

The shipbuilding plant of Doullut & Williams, New Orleans, La., located on Lake Pontchartrain, will be offered at public sale on Jan. 9, under the direction of Harry Fitzpatrick, New Orleans. The plant represents an investment of $2,000,000, and is the largest shipyard in the South.

A vocational department will be installed in the high school to be erected by the Board of Education, Albany, Ala., estimated to cost close to $200,000.

The Copeland Garage, Gadsden, Ala., is planning to rebuild its automobile service and repair works recently destroyed by fire with loss estimated at about $35,000. Fred Lucy is head.

California

LOS ANGELES, Dec. 6.

J. J. Ferlin, Modesto, Cal., operating a machine shop and foundry, has completed negotiations with the Chamber of Commerce, Turlock, Cal., for a site for the establishment of a new plant. The present works will be removed and about $30,000 expended for additional equipment and improvements.

The Board of Education, Colton, Cal., is having plans prepared for a one-story manual training building for the high school department, 45 x 270 ft., estimated to cost close to $200,000, including equipment. Allison & Allison, 1405 Hibernian Building, Los Angeles, are architects.

The Pacific Gas & Electric Co., 445 Sutter Street, San Francisco, is planning for extensions and improvements in its power house at Manteca, Cal., to cost about $35,000.

The Pacific Fruit Express Co., 65 Market Street, San Francisco, a subsidiary of the Southern Pacific Railroad Co., has completed plans for an addition to its ice-manufacturing plant at Calwa, Cal., to cost about $55,000. The company engineering department is in charge.

The Universal Pump & Mfg. Co., Redding, Cal., recently organized with a capital of $50,000, is perfecting plans for the operation of a local foundry and machine shop, with adjoining works to manufacture deep-well pumping machinery. The company is headed by I. J. Johnson, who has been operating a foundry in the city, and S. F. Henderson.

The Eastman Welding Co., Los Angeles, is having plans prepared for a one-story factory on Los Angeles Street, 100 x 150 ft. Bids will be asked at an early date. Albert C. Martin, 430 Higgins Building, is architect.

The Merced Irrigation District, Merced, Cal., is arranging for a bond issue of $12,000,000, a portion to be used for the construction of a hydroelectric power plant at Exchequer.

The Joseph Musto Sons-Keenan Co., Twenty-sixth Street and Los Angeles River, Los Angeles, is arranging for the immediate rebuilding of its tile and marble finishing shops, recently destroyed by fire.

Seattle

SEATTLE, Dec. 6.

The Johnson Eureka Combination Spray Co., Yakima, Wash., manufacturer of spraying machinery, has acquired property in the Millview district for the erection of a new plant. Plans will be drawn at an early date.

The Columbia Wood Products Co., 508 Couch Building, Portland, Ore., recently organized with a capital of $250,000, has acquired property at Astoria, Ore., for a new plant. The first unit, with machinery, will cost about $200,000.

G. W. Osgood, 612 Tacoma Building, Tacoma, Wash., port engineer, is completing plans and specifications, and will call for bids early in the coming year for dock equipment, including four 3 to 5-ton cranes, loft and boom type; about 4000 ft. of monorail trackage and one 2-ton electric monorail hoist; conveyor equipment; loading and unloading machinery; stacking machines, etc.

N. H. Medbury and W. F. Miller, Yakima, Wash., are organizing a company with capital of $500,000 to construct a plant to manufacture a special automatic pump for irrigation service, invented by Mr. Medbury. The initial works are estimated to cost close to $100,000, including machinery. Mr. Miller will be president of the company.

The Northwestern Electric Co., 58 Sutter Street, San Francisco, is planning to rebuild its electric power house at Camas, Wash., recently destroyed by fire with loss estimated at about $75,000.

The Ingram Air Locked Rim Co., Walla Walla, Wash., is arranging a list of equipment for installation in a building, recently leased, to manufacture automobile wheel rims.

The Artificial Ice & Cold Storage Co., Billings, Mont., has completed plans for an addition to its ice plant, 30 x 150 ft., at First Street and Avenue S.

The Ohio Match Co., Spokane, Wash., will build a new one-story planing mill at Yardley, Wash., to be equipped for a daily capacity of about 50,000 ft. of lumber. It is estimated to cost close to $45,000, including machinery. Fred A. Shore is manager.

The Ingram Air Locked Rim Co., Walla Walla, Wash., Oscar Ingram, president, is negotiating for a site for the erection of a plant to manufacture tire rims for automobile wheels.

Canada

TORONTO, Dec. 12.

Some very good machine-tool business is being closed and dealers are well satisfied with conditions. Inquiries for equipment are numerous, but many are not expected to develop into sales until after the first of the year. Prospective business for 1922 is exceptionally bright. Announcements regarding the construction of new plants are still appearing and as a consequence the general outlook in the machine-tool market is better than at any time since the close of the war. There is no talk of a revision in prices and most dealers expect present quotations to hold for the next two or three months at least.

The Beaver Truck Co., 369 Wilson Street, Hamilton, Ont., will build an addition to cost $50,000.

Latour & Dupuis, Inc., St. Johns, Que., will build a planing mill to cost $30,000 and has awarded the general contract to Pierre Trahan, St. Johns, Que.

The Peninsular Sugar Co., is preparing to start work in the early future on the erection of beet sugar factory at Petrolia, Ont., to cost $1,200,000. The Honolulu Iron Works Co., 8047 Hamilton Boulevard, Detroit, Mich., is engineer.

C. J. Brown, city clerk, Winnipeg, will receive bids until Jan. 9, for two 310 k.v.a., three-phase alternators. Specifications may be obtained from the manager of the Hydro Electric System, 55 Princess Street, Winnipeg.

The Moncton Tramway Gas & Electric Co., Ltd., Moncton, N. B., has awarded the general contract for the construction of a power plant to cost $35,000 to T. E. Gilbert, 15 Ralph Street.

The mill of the Reid Lumber Co., Toronto, was destroyed by fire Dec. 8 with a loss of $50,000. Machinery valued at $35,000 will be a total loss.

The Malleable Castings Co., Smiths Falls, Ont., has reopened a portion of its plant giving employment to 50 men.

The Colonial Motors, Ltd., has purchased the Canadian plant of the Detroit Lubricator Co., Walkerville, Ont., and will install additional equipment. The transfer includes land, buildings and machinery.

Guelph, Ont., is preparing to purchase equipment for the waterworks plant in connection with the decision to supplement the present steam equipment with that of electrical driven centrifugal pumps. The city will purchase one Imperial 3,000,000 gal. electrically driven centrifugal pump and one 3,000,000 gal. electrically driven booster pump as an auxiliary. Two 3,000,000 gal. gasoline or Diesel driven units will also be bought.

The Bell Piano & Organ Co., Guelph, Ont., is considering the installation of two new boilers to replace the three at present in use.

J. R. Baxter, 102 St. Antoine Street, Montreal, will start work in the near future on a factory, 60 x 200 ft. on Pearl Street East, Brockville, Ont., to manufacture abrasive wheels, etc.

BOOK REVIEWS

Employment Methods. By Nathan W. Shefferman. Pages, xx + 573, 5½ x 8½ in.; numerous illustrations. Published by Ronald Press Co., New York.

In an effort to cover in all its ramifications the subject of employing this book is divided under five general heads. Under the first is treated the employment department itself, showing why such a department has come into existence, how to establish one, how it should function, and what manner of man (or woman) should be chosen to manage it.

Under the second and third heads comes the getting and holding of employees. Many examples of forms used in various establishments for recording the employee's qualifications before employing him are shown, as well as those for checking him afterward. Methods for securing applicants, as well as hiring, selecting, assigning, and identifying are given. The charting of labor turnover, the training of employees and the methods of wage payments are also here discussed.

Under the fourth head are given the methods of employing for offices, stores, banks and similar institutions. Typical forms and methods of such institutions as the Metropolitan Life Insurance Co. and the National City Bank are given in considerable detail. Under the fifth head called the "human element," the larger matters that have a bearing on employment are taken up. Such include service work, that is, the follow up of the worker to see that he is contented, the visiting nurse to see why he is absent, house organs, bonuses of various kinds, and profit sharing. Housing and that large subject of to-day, industrial democracy, are discussed. Plans of such institutions as the Standard Oil, Bridgeport Brass Co., Rockefeller, Willys-Overland and Studebaker are outlined. There are also several appendices which give in detail the employment schemes of large concerns referred in the main text. E. C. R.

Time Study and Job Analysis. By William O. Lichtner. Pages, xvii + 397, 6 x 8½ in.; 81 forms and illustrations. Published by Ronald Press Co., New York.

As the application of science in management progresses, and at the same time stern necessity requires greater savings in production costs, the value of job analysis and time-study methods becomes more and more apparent. At the same time the use of time-study results in rates of payment and anything involving payment must be carefully and properly applied. So perhaps the chief value of Mr. Lichtner's book is not so much in its recommendations as to technique, valuable as they are, but in the author's stress on the finality of the findings of time-studies. He insists upon the proper investigation (and correction where necessary) of conditions prevailing when and where the time-studies are made.

For this reason undoubtedly, the first four chapters are devoted to job standardization. The effect upon the worker, the manager, the industry itself, is described. Applications ranging from shoe shining to repair work in a machine shop are covered. The saving of material, time and overhead is discussed. Then three chapters are devoted to the organization of a staff to start and carry on the work. The recommendations in this part are based on the author's own experience and offer some excellent ideas to those about to undertake such work.

From then on the major portion of this book is devoted to actual time-study methods. Some thirteen chapters cover such matters as the paving of the way for studies by the observer or analyst, with both the foreman and the worker; the things to be covered in a preliminary study; the taking, computing and analyzing of time values; the determination of the standard time, including all necessary allowances; the determination of and follow up of rates based on time-studies; and finally the perpetuation of the standards established.

The book concludes with interesting discussions of the application of all its findings to such things as increased production, the balancing of manufacturing to selling, and the possibilities of using job standardization as a basis for labor mediation. There are also several appendices in which concrete examples from actual practice are given. E. C. R.

New Books Received

Personnel Research Agencies. Bulletin No. 299 of the United States Bureau of Labor. By J. David Thompson. Pages 207, 6 x 9 in. Published by the Government Printing Office, Washington.

Les Metallurgies Electrolytiques et Leurs Applications. By Albert Levasseur, professor of electrochemistry and electrometallurgy at l'Ecole d'Electricite et de Mecanique Industrielle de Paris. Pages 256, 5½ x 8½ in. Published by Dunod, 47 Quai des Grands-Augustins (vie), Paris, France.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

	Per Lb.
Bars:	
Refined bars, base price	2.68c.
Swedish bars, base price	10.00c.
Soft steel bars, base price	2.68c.
Hoops, base price	3.53c.
Bands, base price	3.28c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	2.78c.
Channels, angles and tees under 3 in. x ¼ in., base	2.68c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	2.65c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	2.85c.
Toe calk, ½ x ⅜ in. and larger	3.25c.
Cold-rolled strip, soft and quarter hard	6.25c. to 7.25c.
Open-hearth spring steel	3.75c. to 6c.
Shafting and Screw Stock:	
Rounds	3.88c.
Squares, flats and hex	4.38c.
Standard cast steel, base price	12.00c.
Extra cast steel	17.00c.
Special cast steel	22.00c.

Tank Plates—Steel

¼ in. and heavier	2.78c.

Sheets

Blue Annealed

	Per Lb.
No. 10	3.28c. to 3.53c.
No. 12	3.33c. to 3.58c.
No. 14	3.38c. to 3.63c.
No. 16	3.48c. to 3.73c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet, Per Lb.
Nos. 18 to 20	3.80c.	.....
Nos. 22 and 24	3.85c.	4.10c.
No. 26	3.90c.	4.15c.
No. 28	4.00c.	4.25c.
No. 30	4.25c.	.....

No. 28 and lighter, 36 in. wide, 10c. higher.

Galvanized

	Per Lb.
No. 14	3.95c. to 4.10c.
No. 16	4.10c. to 4.25c.
Nos. 18 and 20	4.25c. to 4.40c.
Nos. 22 and 24	4.40c. to 4.55c.
No. 26	4.55c. to 4.70c.
No. 27	4.70c. to 4.85c.
No. 28	4.85c. to 5.00c.
No. 30	5.35c. to 5.50c.

No. 28 and lighter, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
½ in. Butt	—55	—40	¾-in. But	—30	—13
¾ in. Butt	—60	—46	1½-in. Butt	—32	—15
1-3 in. Butt	—62	—49	2-in. Lap	—27	—10
3½-6 in. Lap	—59	—45	2½-6-in. Lap	—30	—15
7-8 in. Lap	—55	—41	7-12-in. Lap	—23	— 7
9-12 in. Lap	—54	—40			

Steel Wire

BASED PRICE* ON NO. 9 GAGE AND COARSER	Per Lb.
Bright basic	4.00c.
Annealed soft	4.00c.
Galvanized annealed	4.75c.
Coppered basic	4.50c.
Tinned soft Bessemer	6.00c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	17¼c. to 17½c.
High brass wire	17¼c. to 17½c.
Brass rod	14¼c. to 15 c.
Brass tube, brazed	26 c. to 27½c.
Brass tube, seamless	18 c. to 19 c.
Copper tube, seamless	21 c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 21½c. per lb. base.

Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14-20		
	Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20		Primes	Wasters
			80 lb.	$6.05	$5.80
			90 lb.	6.15	5.90
			100 lb.	6.25	6.00
IC	$10.00	$8.50	IC	6.40	6.15
IX	11.25	10.00	IX	7.40	7.15
IXX	13.00	11.50	IXX	8.40	8.15
IXXX	14.75	13.25	IXXX	9.40	9.15
IXXXX	16.25	15.00	IXXXX	10.40	10.15

Terne Plates

8-lb. Coating 14 x 20

100 lb.	$7.00
IC	7.25
IX	7.50
Fire door stock	10.00

Tin

Straits, pig	34c.
Bar	40c. to 42c.

Copper

Lake ingot	16 c.
Electrolytic	15¾c.
Casting	15¼c.

Spelter and Sheet Zinc

Western spelter	6½c. to 7c.
Sheet zinc, No. 9 base, casks	10½c. open 11c.

Lead and Solder*

American pig lead	5¾c. to 6¼c.
Bar lead	6¾c. to 7 c.
Solder, ½ and ½ guaranteed	25c.
No. 1 solder	23c.
Refined solder	20c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	80c.
Commercial grade, per lb	40c.
Grade D, per lb	35c.

Antimony

Asiatic	6½c. to 6¾c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb	29c. to 31c.

Old Metals

Business is quiet but prices are steady. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy crucible	11.25
Copper, heavy wire	10.75
Copper, light and bottoms	8.25
Brass, heavy	5.50
Brass, light	4.50
Heavy machine composition	8.00
No. 1 yellow brass turnings	5.50
No. 1 red brass or composition turnings	7.00
Lead, heavy	3.75
Lead, tea	2.50
Zinc	2.50